2.0 Affected Environment

2.1 Social/Economic Characteristics

2.1.1 Community Description

The project corridor comprises six townships in two counties (Henderson and Warren) and includes both rural areas and a developed city. The six townships include Biggsville, Carman, and Gladstone in Henderson County and Lenox, Monmouth, and Tompkins in Warren County. The population and community characteristics reflect the importance of the agricultural base of these areas. Residences in the project corridor, with the exception of Monmouth, tend to be single family units that are either clustered in small towns or spread out in association with farmsteads. These communities are associated with rural areas where agricultural activities are important. The City of Monmouth, with a 1990 population of 9,489, is the largest community and accounts for 58 percent of the population in the project corridor (U.S. Census, 1990). Three communities (Gulfport, Gladstone, and Biggsville) in Henderson County are each less than 500 in population (1990 statistics) and the only other community in the Warren County portion of the project corridor is Kirkwood (population of 884) (Table 2-1) (U.S. Census, 1990).

Table 2-1. Existing Population of the General Study Area

		Population			Change 1980 to 1990	
Region by County		Average Household Size	1980	1990	Number	Percent
Henderson		2.49	9,114	8,096	-1,018	-11
Warren		2.48	21,943	19,181	-2,762	-12
Total			31,057	27,277	-3,780	-12
Township	Village					
Biggsville		2.62	702	627	-75	-11
	Biggsville	2.51	411	349	-62	-15
Carman		2.52	473	398	-75	-16
Gladstone		2.44	1,423	1,166	-257	-18
	Gladstone	2.14	354	270	-84	-24
	Gulfport*	2.19	224	209	-15	-7
Lenox		2.83	418	354	-64	-15
Monmouth		2.38	11,758	10,546	-1,212	-10
	Monmouth	2.36	10,706	9,489	-1,217	-11
Tompkins		2.79	1,359	1,177	-182	-13
	Kirkwood	2.79	1,008	884	-124	-12
Henderson County Townships			2,598	2,191	-407	-16
Warren County Townships			13,535	12,077	-1,458	-11
Percent of Henderson County Population			51%	53%		
Percent of Warren County Population			62%	63%		

* Gulfport population represents both Carman and Gladstone Township population.

Source: U.S. Census, 1990.

The locations of these communities relative to existing U.S. Route 34 are shown on Figure 1-1. Gulfport, Biggsville, Kirkwood, and Monmouth are immediately adjacent to U.S. Route 34, with Gladstone approximately 2 km (3 mi) north of U.S. Route 34.

The communities of Gulfport, Gladstone, and Biggsville are located near railroad lines and/or U.S. Route 34. Gulfport is located at the western terminus of the project area in Henderson County. This community is situated on the east bank of the Mississippi River. These communities are surrounded by agricultural lands. Population declines in these communities between 1980 and 1990 are consistent with county trends.

U.S. Route 34 currently bypasses Kirkwood, a community of 884 people; however, the community is bisected by the Burlington Northern Railroad. Adjacent land uses are agricultural, and population trends are similar to the other communities in the project area.

Located at the eastern terminus of the project corridor, Monmouth is an established community which represents the largest residential area in the project area. Monmouth has experienced an overall population decline since 1970, declining 11 percent between 1980 and 1990.

2.1.2 Demographics

The project corridor, defined as three townships in Henderson County and three townships in Warren County, reflects characteristics consistent with the population statistics and trends of each county. Biggsville, Carman, and Gladstone Townships comprise 27 percent of the population of Henderson County (U.S. Census, 1990). Lenox, Monmouth, and Tompkins Townships account for 63 percent of the total population of Warren County (U.S. Census, 1990). There has been approximately a 10 percent decline in population within the project corridor between 1980 and 1990 (see Table 2-1). This population loss is occurring in both the communities and rural areas of Warren and Henderson Counties. The six townships in the project corridor represent approximately 52 percent of the total population of the two counties.

Future populations are expected to increase in Henderson and Warren Counties according to the Illinois Bureau of the Budget Estimates. Henderson County is projected to experience a 17 percent increase, and Warren County is projected to increase 6 percent in population between 1990 and 2020 (Table 2-2). The population trends for a 50-year period are shown on Figure 2-1. Even with increases for the next 30 years, the total population in the counties will only approximate 1970 levels.

Table 2-2. Projected Change in Population in the Project Area

County	Population			Change, 1990 to 2020	
	1990	2005	2020	Number	Percent
Henderson	8,096	8,567	9,458	1,362	17
Warren	19,181	19,328	20,256	1,075	6

Source: U.S. Census, 1990 and Illinois Population Trends 1990 to 2020 (Illinois Bureau of the Budget).

The average household size in the two counties is approximately 2.5 people. This average is consistent with the townships and communities within the project corridor (see Table 2-1). The age profiles for the communities in the project area indicate that the majority of the population ranges

from 18 to 65 years (Table 2-3). The median age range is from 36.6 years to 41.7 years, while the population segment over 65 is increasing.

A change in the age profile over time is one factor for analyzing a community's future growth potential and transportation requirements. A comparison of census data for 1980 and 1990 (see Table 2-3) indicates less than 1 percent increase in the working age population (18 to 65) from 1980 to 1990 in Henderson County. The working age population has remained a stable component of the population; however, the percentage over 65 has increased and remains above the state average in both counties.

Table 2-3. Population by Age

	Years of Age		
County	Under 18	18 to 65	Over 65
Henderson County			
1980	29.3%	57.7%	13.0%
1990	25.5%	58.1%	16.3%
Warren County			
1980	28.4%	56.8%	14.7%
1990	25.9%	56.8%	17.3%

Source: U.S. Bureau of Census, 1980 and 1990.

Small portions of the population are African-American, American Indian, and other minorities. The proportions of African-American and American Indians have slightly increased from 1980 to 1990 (Table 2-4). The percent of Asian or Pacific Islanders have declined over the same time period in Henderson County. Warren County, however, shows a minimal increase in the population of Asian or Pacific Islanders from 1980 to 1990.

Table 2-4. Percent Distribution of Selected Minority Populations by County

County	African-American		American Indian, Eskimo, or Aleut		Asian or Pacific Islander		Other Race	
	1980	1990	1980	1990	1980	1990	1980	1990
Henderson	0.01	0.1	0.04	0.4	0.2	0.1	0.5	0.2
Warren	1.6	1.9	0.1	0.1	0.3	0.4	0.7	0.6

Source: U.S. Census, 1990.

For four of the six townships in the project corridor, the minority percentage was less than 1 percent. In Monmouth, the minority population was 5.3 percent of the total population, the highest in the project corridor (Table 2-5). Additionally, Table 2-5 presents the distribution of minority populations in the two counties within the project area.

Special groups include the elderly, disabled, and religious minorities. Within Monmouth, there are facilities for training and educating disabled citizens. Senior citizen housing is also located in Monmouth. Outside of Monmouth there are no other known clusters of special groups.

Table 2-5. Minority Characteristics of the General Study Area

County	Minorities as % of 1990 Population	Township	City/Village	Minorities as Percent of 1990 Population
Henderson	0.7	Biggsville		1.3
			Biggsville	0.3
		Carman		0.5
			Gulfport Village	0
		Gladstone		0.7
			Gladstone	0
			Gulfport Village	0
Warren	2.9	Lenox		0
		Monmouth		4.9
			Monmouth City	5.3
		Tompkins		0.6
			Kirkwood	0.7

Source: U.S. Census, 1990.

Income

Income levels are affected by the age distribution of the population, unemployment rates, and economic activity of the area. The 1989 income level comparison for the townships in the project corridor is provided in Table 2-6. Only two townships, Gladstone and Lenox, are above the average county per capita income level. The remaining townships have per capita income values 3 to 10 percent below county averages. In general, the income levels for the project corridor are in the middle and lower-middle range for the region. Both Henderson and Warren Counties average county per capita income level was nearly half (56 percent) the 1989 state average of $19,071.

Table 2-6. Per Capita Comparison of Study Area Communities

Community	County Per Capita Income, $		Township Per Capita Income, $	Community/ County % Difference
	1989	1995		
Henderson County	10,638	15,014		
Biggsville Township			9,672	-9.08
Carman Township			9,493	-10.76
Gladstone Township			11,584	+8.89
Warren County	10,591	15,542		
Lenox Township			11,834	+11.74
Monmouth Township			10,309	-2.66
Tompkins Township			9,495	-10.35

Sources: 1989 Income Information-U.S. Bureau of Census, 1990.
1995 Income Information-Illinois Department of Commerce and Community Affairs, 1996.

By 1995, the per capita income in Henderson County had increased from $10,638 in 1989 to $15,014, however, the overall ranking was 95th (out of 102 counties) in the state (Illinois Department of Commerce and Community Affairs, 1996a). In Warren County, per capita income increased from $10,591 in 1989 to $15,542 in 1995 (Illinois Department of Commerce and Community Affairs, 1996b). Warren County was ranked 91st in the state. The Illinois state average per capita personal income was $25,293 in 1995.

Other statistics consistent with the low per capita income levels are the median household income and persons below the poverty level. Approximately 15 percent of the Henderson County population and 17 percent of the Warren County population fall below the poverty level. This is higher than the Illinois average of 11.9 percent. The median household income values also reflect low per capita of these two counties (Table 2-7).

Table 2-7. Low Income/Unemployment Characteristics

Area	Median Household Income (1989), $	Unemployed, % (Ages 16 to 64)	Persons Below Poverty Level, %
Henderson County	26,699	5.9	14.9
Warren County	27,271	5.2	16.6
Illinois	32,252	6.6	11.9

* 1990 U.S. Census in: Illinois Economic Profile of Warren County and Henderson County, 1996.

Source: U.S. Census, 1990.

Although unemployment rates of working age residents from 16 to 64 years in both counties are less than the state average, the household income remains low. This may be associated with an increase in the population segment representing those over 65 years of age.

2.1.3 Public Services and Facilities

The locations of public facilities within the study are shown on Figure 2-2. These services are associated with the established communities in the project corridor. Municipal buildings such as village and city halls occur in the communities of Monmouth, Biggsville, Gladstone, Gulfport, and Kirkwood.

Schools and School Districts

One school, Union Community School District Unit #115, is located outside of Monmouth (west of Biggsville) on the southeast corner of the U.S. Route 34 and Illinois Route 94/116 intersection (see Figure 2-2). In addition, Monmouth contains ten educational facilities, including four elementary schools, one junior high school, one private school, and Monmouth College. The Monmouth High School Athletic Field is adjacent to U.S. Route 34. Monmouth College has recently purchased land at the southeast corner of U.S. Route 34 and North 11th Street and built athletic fields. No schools are present in the communities of Biggsville, Kirkwood, or Gulfport.

Fire and Police Facilities

Six fire stations are currently located within the project corridor. Monmouth has two fire protection districts staffed on a full-time basis. Both fire stations in Monmouth are located on South Main Street within 0.8 km (0.5 mi) east of Route 67. Fire Department Number One is located at 516 South Main on the northwest corner of Main Street and the Burlington Northern Railroad. Fire Department Number Two is located on the southwest corner of Main Street and 10th Avenue near the southern city limits. The two Monmouth fire departments serve the City of Monmouth with 13 full-time firefighters and 11 volunteers.

The remaining four firefighting facilities (Gulfport, Biggsville, Gladstone, and Kirkwood) are staffed on a volunteer basis. Two fire districts, the Gulfport-Gladstone Fire District and the Biggsville Fire District, serve the project corridor in Henderson County. The project corridor in Warren County is served by volunteer fire fighters in the Central Warren County Fire Protection District.

Two fire stations are located in the Gulfport-Gladstone Fire District. The Gladstone station is located 1.6 km (1.0 mi) north of U.S. Route 34 on the east side of Route 164. The Gulfport station is located directly on U.S. Route 34 on the north side of the road, approximately 1.6 km (1 mi) east of Burlington, Iowa. The Kirkwood Fire Department is located on the southeast side of Kirkwood at 405 East Walnut. This station serves the Central Warren County Fire Protection District with a volunteer staff.

The Biggsville Fire Department is located north of U.S. Route 34 between Blaine Street and Valley Street on the southeast side of Biggsville. This station serves the Biggsville Fire District which extends from the Warren-Henderson County line west to the Gulfport-Gladstone Fire District.

For the portion of the project corridor in Henderson County, police protection is provided by the Henderson County Sheriff's Department. This department is served by a sheriff and nine deputies. Eight of the deputies are assigned to the entire county; one deputy patrols Gulfport.

Police protection for the project corridor is provided by County Sheriff Departments and the City of Monmouth Police Department. The Warren County Sheriff's Department provides protection to the county with the exception of the City of Monmouth. The police station is located in the same building as Fire Department No. One at 516 South Main Street. Police protection in the remainder of Warren County is provided by ten deputies and one sheriff.

The Warren County Sheriff Department headquarters is located in Monmouth at 121 North A Street, adjacent to the town square. The Henderson County Sheriff Departments' headquarters are located in Oquawka, over 8 km (5 mi) north of U.S. Route 34.

Churches

Within the project corridor, churches tend to be associated within the established communities. Five churches are located in the project corridor in the villages of Biggsville, Gladstone, and Kirkwood. Twenty-two churches are located in the City of Monmouth, however, none are located on U.S. Route 34.

Cemeteries

There are two cemeteries in the project corridor west of the City of Monmouth. The Biggsville Cemetery is located over 1.6 km (1.0 mi) north of U.S. Route 34 on the west side of Illinois Route 94. The second cemetery is located northwest of Kirkwood, approximately 3.2 km (2 mi) north of U.S. Route 34. Four cemeteries are located in the City of Monmouth. Three of the cemeteries are located in the city interior. The fourth cemetery is located northeast of town outside the project corridor. There are no cemeteries located along U.S. Route 34.

Medical Facilities

The project corridor is served by one hospital located in the City of Monmouth. Community Memorial Hospital is located on the northwest edge of town at 1000 West Harlem Avenue. The hospital is located within 0.4 km (0.25 mi) to the east of U.S. Route 34.

Two nursing homes are located in the project corridor, both of which are in the City of Monmouth, east of Route 34. Neither facility is located near the proposed improvements to U.S. Route 34

2.1.4 Economic Characteristics

The employment patterns for Henderson and Warren Counties are consistent with the population distribution and land use. There are 9,567 persons employed by Warren and Henderson Counties (Illinois Department of Employment Security, 1996). Warren County, which is more heavily populated, accounted for 8,000 of the persons employed. The distribution in employment patterns for each county and the relative difference in employment base is shown on Figure 2-3.

Government, services, and agriculture account for 68 percent of employment in Henderson County (see Figure 2-3). Agriculture represents approximately 17 to 20 percent of the total employment in each county. Employment in Warren County is supported by the manufacturing sector with educational and health care facilities also being important employers.

The three largest employers in Henderson County are Union Public Schools (140 employees), Henderson County (90 employees), and Southern Public Schools (80 employees). The major private employers all have less than 25 employees (Table 2-8).

Table 2-8. Major Employers of Henderson and Warren Counties, Illinois

County	Employer	Number Employed
Henderson	Union School District, Union	140
	County of Henderson, Oquawka	90
	Southern School District, Stronghurst	80
	Henderson County Retirement Center, Stronghurst	65
	Cessford Construction Company, Biggsville	25
	Fisher Foods, Oquawka	25
	U.S. Post Office, Oquawka	30
	Country Fun, Inc., Biggsville	20
	Henderson County Rural Health Center, Oquawka	20
	Raritan State Bank, Raritan	20
	Jack and Jill, Oquawka	20
Warren	Farmland Foods, Monmouth	900
	Monmouth Public School District, Monmouth	180
	Community Memorial Hospital, Monmouth	150
	Monmouth College, Monmouth	150
	Washington Christian Village, Monmouth	130
	Warren Achievement Center, Monmouth	90
	Christian Homes, Inc., Roseville	90
	City of Monmouth, Monmouth	90
	Twomey Company, Smithshire	80

Source: Illinois Department of Commerce and Community Affairs, 1996. (Economic Profile by County).

Eleven of the 15 largest employers in Warren County are located in Monmouth. Farmland Foods, located just north of the U.S. Route 34 bypass in Monmouth, is the largest employer in Warren County. Other large employers include Monmouth Public Schools, Community Memorial Hospital, and Monmouth College (see Table 2-8).

Based on analysis prepared by Illinois Department of Commerce and Community Affairs, total employment for Warren and Henderson Counties is projected to grow from 9,123 in 1992 to 10,272 in 2005, an increase of almost 13 percent. Mining is the only industry that shows a decrease in projected jobs from 1992 to 2005.

Growth in transportation and public utility employment is expected to account for almost 25 percent of the job growth in Warren and Henderson Counties. Growth in services, construction, and trade positions is expected to contribute over 50 percent of the employment opportunities in the two-county area from 1992 to 2005. The majority of the employment in the two-county area is presently located in the metropolitan areas and is anticipated to remain there. Although, agriculture is an integral aspect of the economics of Warren and Henderson Counties, agricultural jobs are expected to increase from 1992 to 2005 by less than 2 percent.

Two other communities outside of the project corridor, but contributing to the transportation needs and possibly offering additional employment, are Burlington, Iowa on the western end of the project corridor and Galesburg, Illinois approximately 24 km (15 mi) east of Monmouth.

Burlington, Iowa is located along U.S. Route 34 just west of the Mississippi River and approximately 42 km (26 mi) west of Monmouth. The total population of Burlington is 27,208. An additional 363,000 people live within 80 km (50 mi) of the Burlington, Iowa community. Employment is primarily associated with manufacturing, retail trade, and services (Iowa Department of Economic Development, Community Quick Reference, 1995).

Galesburg, with a 1990 population of 33,530 (Illinois Department of Commerce and Community Affairs, Community Profile, 1996), is approximately three times the population of the largest city in the project corridor. Manufacturing related businesses employ the greatest number of people in Galesburg. The largest plant lists 2,500 employees.

2.2 Land Use

2.2.1 Existing Land Use

Existing land uses in Henderson and Warren Counties are predominantly associated with agricultural activities. Over 80 and 91 percent of the total area of Henderson and Warren Counties, respectively, are farmed. Other land uses include developed lands in communities and recreational lands. Recreational land uses within the project corridor are shown on Table 2-9.

There are both public parks and privately owned recreational areas within the project corridor. There are 14 recreational facilities located in Monmouth, and nine parks and ball fields are associated with the other communities in the project corridor.

Table 2-9. Public and Private Parks

Location	Facility Name	Type
West of Gladstone	Gladstone Lake, Historical Marker, and Park	Public
Gladstone	Henderson County State Conservation Area	Public
Gladstone	Ball Field	Public
West of Biggsville	Roadside Rest Area	Public
Biggsville	Henderson County Hills, Golf Course and Camping	Private
Biggsville	New Crystal Lake Club	Private
Kirkwood	Lion's Club Ball Park	Private
Kirkwood	City of Kirkwood Park	Public
Kirkwood	Young Lake Campground	Private
Monmouth	Monmouth Park	Public
Monmouth	Gibson Wood's Golf Course	Public
Monmouth	Garwood Park	Public
Monmouth	North Park	Public
Monmouth	Public Square	Public
Monmouth	Siper Diffenbaugh Park	Public
Monmouth	Citizen's Lake Camp Ground	Public
Monmouth	Monmouth Public Swimming Pool	Public
Monmouth	West Park	Public
Monmouth	Diffenbaugh-Harmon Park	Public
Monmouth	Buster White Park	Public
Monmouth	Warfield Park	Public
Monmouth	High School Athletic Field	Public
Monmouth	Monmouth Country Club	Private
Monmouth	Monmouth College Athletic Field	Private
Monmouth	Arena	Public

2.2.2 Land Use Planning

Henderson and Warren Counties have not established land use plans. The City of Monmouth has identified land uses within and adjacent to the city limits. The industrial, commercial, park, and residential areas of Monmouth adjacent to U.S. Route 34 are shown on Figure 2-4. Although land use plans have not been established for Henderson and Warren Counties, both have been predominantly agricultural communities since the late 1800's (Robinson, 1927; Gordon, 1911).

2.3 Agriculture

Agriculture is an important economic element within both Henderson and Warren Counties. Farming revenue is derived from both crops and livestock, and has continued to be a key component of the county employment and revenue patterns.

2.3.1 Operations

Farming activities in Henderson County occur on 414 farms comprising 81,822 ha (202,186 ac). Henderson County ranks 66th in Illinois for total acres farmed. Cropland represents approximately

79 percent of the total land in farms with corn being the primary crop. The sources of farm revenue are shown on Table 2-10. Corn is the most important crop generating over 50 percent of the total farm revenue, which is higher than the state average. Livestock receipts represent approximately 16 percent of total farm revenue. Cash receipts from all crops place Henderson County 57th within the state and livestock receipts are 58th within the state. [Illinois Department of Agriculture (IDOA), 2000].

Table 2-10. Farm Revenue for Henderson and Warren Counties

	Henderson County	Warren County	State of Illinois
Total Number of Farms, 1997	414	710	79,000
Total Ha (ac) in Farm, 1997	81,822 (202,186)	127,503 (315,067)	11,300,000 (27,800,000)
Total Farm Revenue ($1,000s), 1999	47,888	81,300	5,233,802
Farm Revenue as a Percent of Total Revenue, 1999			
All Crops	50.2	46.0	37.7
Corn	27.7	34.4	31.2
Soybeans	0.3	0.1	1.8
Wheat	6.0	2.7	6.7
Other Crops			
All Livestock and Products			
Cattle and Calves	11.6	8.9	7.2
Hogs and Pigs	3.7	5.8	9.6
Other Livestock and Products	0.7	2.2	5.8

Source: Annual Summary Illinois Agricultural Statistics (IDOA), 2000.

Within Warren County there are 710 farms operating on 127,503 ha (315,067 ac). For total land in farms, Warren County ranks 32nd in the state. Cropland represents approximately 83 percent of the total land in farms. Corn is an important cash crop in Warren County, generating approximately 46 percent of the total farm revenue. A few farms in Warren County cultivate crops for seed production. Seed farms are generally concentrated near Kirkwood and range in size from 29.1 to 140.0 ha (72 to 346 ac). Livestock receipts account for 17 percent of the total farm revenue. Warren County ranks 2nd in the state for sheep inventory. Cash receipts from crops place Warren County 27th within the state and livestock receipts are 42nd within the state (IDOA, 2000). Both Henderson and Warren Counties show similar patterns in crop and livestock receipts.

2.3.2 Trends in Farm Operations

Farm operations in Illinois have consistently been declining (in number of farms), while the average size of farms has increased. From 1987 to 1997, the average farm size in Illinois increased from 137 ha (342 ac) to 142 ha (352 ac), while the total number of farms declined from 83,000 to 79,000 (IDOA, 2000).

Farm operations in both Henderson and Warren Counties have experienced similar trends. The 1990 and 1992 Census of Agricultural results are summarized on Table 2-11. Total acreage in farms declined slightly but average farm size increased in both Henderson and Warren Counties.

Table 2-11. Trends in Farm Area within Henderson and Warren Counties

	1987*	1992†	1997**
Average Farm Area, ha (ac)‡			
Henderson County	165 (407)	176 (436)	197 (488)
Warren County	146 (362)	159 (392)	180 (444)
Number of Farms			
Henderson County	522	468	414

Table 2-11. Trends in Farm Area within Henderson and Warren Counties

	1987*	1992†	1997**
Warren County	904	810	710
Land in Farm, ha (ac)			
Henderson County	86,000 (212,513)	82,545 (203,974)	81,822 (202,186)
Warren County	132,307 (326,938)	128,474 (317,467)	127,503 (315,067)

* Annual Summary Illinois Agricultural Statistics (IDOA) 1989.
† Annual Summary Illinois Agricultural Statistics (IDOA) 1997.
** Annual Summary Illinois Agricultural Statistics (IDOA) 2000.
‡ Calculated from number of farms and Land in Farms.

2.3.3 Prime Farmland

Code of Federal Regulations (CFR) Title 7, Volume 6, Section 657.5(a) defines prime farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods.

Eighty-one soil map units have been mapped in Henderson County (Henderson County Soils, 1956), of which 38 are considered prime farmland. The total number of prime farmland acres reported for Henderson County by the Natural Resource Conservation Service (NRCS) is 52,464 ha (129,640 ac). Approximately 64 percent of the total farmland in Henderson County is considered prime farmland.

Sixty-five soil map units are known from Warren County, of which 27 are considered prime farmland soil units (Soil Survey of Warren County, 1998). The Soil Survey of Warren County reported that approximately 101,805 ha (251,565 ac) of prime farmland occurred in Warren County. Approximately 72 percent of the total farmland within Warren County is considered prime farmland.

There are no unique soils in Illinois. Soils not classified as either Prime or Important are regarded as other soils.

2.3.4 Special Agricultural Land

The Agricultural Areas Conservation and Protection Act of 1979 provided for the establishment of Agricultural Conservation and Protection Areas (Ag Areas) to preserve agricultural land for the production of food and other agricultural products and to conserve and protect agricultural land as valued natural and ecological resources. Landowners may request their county boards to designate their farmlands as Ag Areas. Ag Areas must contain a minimum of 350 acres, are established for a period of 10 years, and can be renewed. Land in Ag Areas can only be used for agricultural purposes. There are no Ag Areas in the project corridor.

2.3.5 Statewide Important Farmland

Farmland of statewide importance is land other than prime farmland that is considered valuable for the production of food, feed, forage, and oilseed crops (CFR Title 7, Volume 6, Section 657.5). Important farmland is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. Farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Twenty-nine important soil map units have been classified in Henderson County

totaling 28,129 ha (69,508 ac) or 34 percent of farmland. Twenty-three soil map units are classified as important in Warren County, totaling 29,071 ha (71,835 ac) or 23 percent of farmland.

2.3.6 Centennial Farms

An agricultural property must have been owned by the same family of lineal or collateral descendants for at least 100 years to qualify for Centennial Farm status. Based on a September 21, 2001 Centennial Farm Query by county, there are 48 Centennial Farms in Henderson County and 88 Centennial Farms in Warren County.

2.3.7 Conservation Reserve Program

The Conservation Reserve Program encourages farmers to voluntarily plant permanent areas of grass and trees on land that need protection from erosion, to act as windbreaks, or in places where vegetation can improve water quality or provide food and habitat for wildlife. In return, they receive annual rental payments, incentive payments for certain activities and cost-share assistance to establish the protective vegetation. A total of 775.6 ha (1,915.1 ac) of land are associated with the CRP in Warren County, and a total of 485.3 ha (1,198.3 ac) of land are in the CRP in Henderson County. The CRP land primarily consists of grassy riparian/filter strips along waterways.

2.3.8 Land Capability Groupings

Land capability groupings indicate the suitability of soils for the majority of field crops. The groupings are based on soil characteristics, geomorphic conditions, and soil erosion susceptibility. Soils are classed according to their limitations as field crops, the risk of damage when cultivated, and the way soils respond to treatment.

Land capability groupings are divided into eight soil classes designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The individual capability groups are listed below:

- Class I soils have few limitations or hazards that restrict their use.
- Class II soils have moderate limitations or hazards that reduce the choice of plants or that require moderate conservation practices.
- Class III soils have severe limitations or hazards that reduce the choice of plants that require special conservation practices, or both.
- Class IV soils have very severe limitations or hazards that reduce the choice of plants or that require very careful management, or both.
- Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.
- Class VI soils have severe limitations or hazards that make them generally unsuitable for cultivation.
- Class VII soils have very severe limitations or hazards that make them unsuitable for cultivation.
- Class VIII soils and miscellaneous areas have limitations or hazards that nearly preclude their use for commercial crop production.

Soils within the project corridor include Class I to Class VII. Prime and statewide important soils are generally classified in one of the first three classes. The more restricted classes are limited to steep

sloped drainages and are primarily located along Bogus Hollow Road just southeast of Gladstone in Henderson County. Those soils included in Class III to VIII designated by a slope class of C or greater are considered highly erodible. NRCS designates erodible soils with an "e" following each soil unit.

The Henderson County portion of the project area is comprised predominantly of open agricultural land with some scattered residential development. The topography varies from floodplain on the far west through a steep bluff area and then rolling landscape to the east. Farming activities in the project corridor consist primarily of row crop with pasture, old field, and woodlands interspersed throughout the county. The soil classes present within the project corridor in Henderson County include Class I, II, III, IV, VI, and VII. Soil Classes III, IV, VI, and VII with a slope class of C or greater are considered highly erodible. Highly erodible soils account for approximately 16 percent of the proposed project right-of-way.

Topography in Warren County is generally flat to a rolling landscape with land use dominated by row crop and seed production. The soil classes encountered in the project corridor within Warren County include Class I, II, III, IV, and VI. Soil classes IIIe, IVe, and VIe are considered highly erodible, and comprise approximately 17 percent of the proposed project right-of-way.

2.4 Cultural Resources

Cultural resource surveys, focusing on archaeological sites, historic sites, and historic structures (i.e., extant structures), were initiated within the project corridor in 1996. A preliminary archaeological and historic site investigation was completed in the project corridor between Gulfport and Monmouth by the Center for American Archaeology under contract to IDOT. Initial investigations included a review of the regional archaeological literature and a file search for previously recorded sites. Based on these initial investigations, areas with high potential for historic or prehistoric occupations were identified and mapped within the corridor. A Phase I archaeological survey, comprising pedestrian walkovers of cultivated fields, was conducted on these high potential areas in the winter of 1997-98. Approximately 1,270 ha (3,140 ac) of the project corridor were surveyed for potential prehistoric and historic sites. Prehistoric and historic sites were defined as those sites containing three or more artifacts within a 10-meter (m) [33 feet (ft)] radius (Goatley, 1998). A request for comments and copies of the archaeological survey report will be sent by the Federal Highway Administration (FHWA) to the Peoria tribe since they are known to have historical ties to this area of Illinois.

In 1996, a preliminary historic architectural survey was conducted for existing structures. The project corridor specific to the historical architectural inventory consisted of a 122-m (400-ft) wide corridor or 61 m (200 ft) on either side of existing U.S. Route 34 from the intersection of U.S. Route 34 and Carman Road to the intersection of U.S. Routes 34 and 67. The National Register of Historic Places (NRHP) criteria were used to evaluate the potential historic architectural significance of individual structures. These criteria include age of structure, location, design, setting, workmanship, materials, and association with events or persons considered historically significant (White, 1996).

2.4.1 Regional Prehistoric Summary

Regional prehistory can be divided into periods based on large scale cultural or technological advances. Earlier periods are represented by small bands of hunters and gatherers while later periods consist of more advanced civilizations with greater dependence on agriculture. The archaeological

record of West-Central Illinois indicates that the following sequence of prehistoric cultures occurred in the region:

- Paleoindian (12,000 to 10,000 B.P.*)
- Early Archaic (10,000 to 8,000 B.P.)
- Middle Archaic (8,000 to 5,000 B.P.)
- Late Archaic (5,000 to 2,500 B.P.)
- Early Woodland (2,500 to 2,000 B.P.)
- Middle Woodland (2,000 to 1,650 B.P.)
- Late Woodland (1,650 to 750 B.P.)
- Mississippian (950 to 650 B.P.)
- Oneota (950 to 300 B.P.)

* B.P.- "Before Present" where present is defined as the year 1950 A.D.

Paleoindians were the first inhabitants to occupy North America, which occurred during the last Ice Age. This culture is generally depicted as small nomadic bands of big game hunters and gatherers. With the retreat of glaciers and the extinction of big game, Archaic cultures were forced to adapt to a changing environment by developing new hunting techniques for smaller animals. The Woodland Period is identified with the initial use of agriculture, bows and arrows, pottery-making, and burial mounds. The temple-mound-building Mississippian cultures built permanent settlements consisting of complex societies in the floodplains of large rivers with dependence on maize as a food source. The Oneota Indians, for example, consisted of small bands of hunter/gatherers and farmers (Chapman and Chapman, 1997).

2.4.2 Regional Historic EuroAmerican Summary

In May 1812, Congress enacted legislation to reward volunteer soldiers for military service in the War against the British (War of 1812) with land tracts known as "bounty land." These areas were established in Arkansas, Michigan, and Illinois and were generally located on the outskirts of established settlements. Since settlers in these frontier areas were more likely to be involved in Native American skirmishes, the bounty lands were often sold or given away by veterans of the war. All of Henderson and Warren Counties were once part of the original military land tracts. The Illinois tract was open to settlement after it was surveyed in 1815-1816. Henderson and Warren Counties were first settled by either veterans of the War of 1812 or individuals that had purchased or received bounty lands (Rankin, 1992).

Gradually, settlers moved from Kentucky, Indiana, Ohio, and New York to the military tract in Illinois. In 1825, Warren County was formally organized and originally included all of Henderson County. In 1841, Warren County was divided to establish Henderson County (Moffet, 1903).

The towns of Gladstone, Biggsville, and Kirkwood were platted in the mid-1850s. The growth of these cities was enhanced by an east-west railroad connector. The Peoria and Oquawka Railroad was completed by 1857 and connected Burlington, Gladstone, Biggsville, Kirkwood, and Monmouth to Peoria. By 1870, a north-south railroad connected St. Louis with Monmouth and Rock Island (Rankin, 1992).

The village of Monmouth was organized in 1836 and recognized as a city in 1852 (Robinson, 1927). With the completion of the railroad, Monmouth experienced an explosion of industrial growth. Many foreign immigrants came by rail to work in coal mines, cigar factories, and other industries in

Monmouth. Today, new industries such as trucking companies and soybean processing plants have now replaced many of the 19th century manufacturing companies (Rankin, 1992).

2.4.3 Archaeological Resources

The proposed corridor consists of six types of landforms: Mississippi Valley floodplain, Mississippi Valley terraces, Mississippi Valley bluffline, Secondary Valleys, Upland Ridges, and Upland Flats. Based on literature reviews and database searches, a general pattern exhibited by prehistoric cultures indicates greater utilization of the Mississippi floodplain terraces and secondary creek valleys than other areas. The Mississippi Valley floodplain terraces appear to contain habitation sites comprising large, intensive occupations inhabited by several different cultural groups. In contrast, the upland regions contain more individual sites consisting of short term occupations (Goatley, 1998).

The preliminary Phase I archaeological survey identified a total of 84 sites in the project corridor which contained prehistoric cultural artifacts. The State Historic Preservation Office (SHPO) has concurred that 37 of these sites do not meet the criteria for National Register eligibility and required "no further work."

Approximately 13 sites have yielded temporal diagnostic artifacts or artifacts that could be referenced to a particular time frame and occupation. These objects indicate the project corridor was used for habitation during the Middle Archaic, Late Archaic, Early Woodland, Middle Woodland, Late Woodland, and Mississippian Periods. Temporal diagnostic artifacts at different sites indicate the project corridor contains several potential significant prehistoric occupation sites. At least four sites were occupied by cultural groups from different cultural periods.

There are two sites with clear evidence of prehistoric burial mounds. One site contains two circular mounds and one burial knoll. A potter's pit is located in the center of one of these mounds. The other site contains 12 mounds and four burial knolls. Visible signs of vandalism were apparent for six of the 12 mounds. In addition, there are two, heavily disturbed sites which could be potential mortuary sites. If these sites are indeed locations of burial knolls, it may be possible that remnants of the lower layers, or bases, could remain intact (Goatley, 1998).

Eight historic Euro-American sites were identified within the area where the historical architectural inventory was conducted (see Section 2.4). Of these eight sites, five sites appear to contain remnants of late 19th/early 20th century structures and three appear to be trash dumps. None of these sites are considered to be potentially significant historic sites by the Center for American Archaeology (Goatley, 1998).

2.4.4 Historic Architectural Resources

The historical architectural inventory for historic structures identified 108 sites containing 307 individual structures within the project corridor. A total of 34 structures on 25 sites was identified as potentially eligible for the NRHP. The majority of these structures are residences and barns built in the early- to mid-twentieth century. One steel windmill estimated to date from the early 1900s is potentially eligible for NRHP (White, 1996).

2.5 Air Quality

The National Ambient Air Quality Standards (NAAQS), established by the U.S. Environmental Protection Agency (USEPA), set maximum allowable concentration limits for six criteria air pollutants. Areas in which air pollution levels persistently exceed the NAAQS may be designated as "non-attainment." States in which a non-attainment area is located must develop and implement a State Implementation Plan (SIP) containing policies and regulations that will bring about attainment of the NAAQS.

All areas of Illinois currently are in attainment of the standards for four of the six criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. Chicago and Metro-East St. Louis are classified as non-attainment for the 1-hour ozone standard. In addition, Cook, DuPage, Kane, Lake, McHenry, and Will Counties, Aux Sable and Goose Lake Townships in Grundy County, and Oswego Township in Kendall County have been classified as a severe ozone non-attainment area. Lake Calumet and McCook in Cook County have been designated as non-attainment for the particulate matter (PM_{10}) standard. The sources of PM_{10} that prompted the non-attainment classification are unrelated to transportation. All other areas of Illinois currently are in attainment for the ozone and PM_{10} standards.

No portion of this area is located within a designated non-attainment area.

2.6 Natural Resources

2.6.1 Geological Setting

2.6.1.1 Bedrock and Structural Geology

The project corridor lies on the western flank of the Paleozoic bedrock structure known as the Illinois Basin, between the Mississippi River Arch and the LaSalle anticlinal belt. The Illinois Basin consists of more than 1,000-m (3,281-ft) thick sequence of bedrock which dips toward the southeast. The bedrock is exposed at several locations within Warren and Henderson Counties in creek beds and quarries. The near surface bedrock formations and sedimentary rock formations were formed primarily in inland seas. The types of rock encountered include limestone, shale, sandstone, siltstone, and coal. Bedrock valleys occur within the uppermost Pennsylvanian and Mississippian bedrock in the project area. The shallow bedrock Mississippian limestone, Devonian/Silurian dolomite, Ordovician sandstones, and Cambrian sandstones serve as shallow bedrock aquifers within the project corridor and are used for public and private water supply wells.

2.6.1.2 Surface Geology and Topography

Within the project corridor, two distinct morphological regimes exist. These include the broad upland areas (uplands) and the stream valleys. The upland area encompasses the section of the project corridor from Monmouth west to approximately Kirkwood, where existing U.S. Route 34 enters the Mississippi River Valley. In general, the surficial deposits within the uplands are glacial drift and windblown loess (i.e., windblown deposits of silt and clay), while the surficial deposits within the stream valleys consist of graded and stratified fluvial deposits.

At least two major stages of glaciation of the Pleistocene Series are represented by the unconsolidated deposits found over the bedrock. The Wisconsinan glaciation did not extend into the project corridor

but contributed glacial outwash and loess to the overburden. The Illinoisan and other possible glaciations encroached upon the project corridor, depositing glacial drift in the form of ice-laid till and water-borne outwash. The thicknesses of these glacially derived deposits range from 0 m to more than 30 m (0 ft to 100 ft). The till deposits are generally unstratified heterogeneous mixtures of clay, sand, gravel, silt, and boulders deposited by glacial ice. The outwash is typically clay, silt, sand, and gravel deposits which are bedded and sorted, much like a typical stream deposit. The upland surficial soils are typically derived from windblown loess which overlies the glacial drift.

The western portion of the project corridor is located within the Mississippi River Valley. The unconsolidated material within the Mississippi River Valley is referred to as quaternary alluvium. Well drilling records obtained from the Illinois State Geological Survey (ISGS) indicate that sediments within the Mississippi River Valley range in thickness from 30 to 52 m (100 to 170 ft) atop competent bedrock. The level of detail contained with the drilling records does not allow for differentiation between alluvial sediments and glacial drift. The sediments within the available well logs include fine to coarse sands, silty and sandy loam, clay, gravel, and till. Silt deposits will stand in vertical bluffs but will undergo rotational slumping and mass movement if the slope is changed.

The Mississippi River Valley within the project corridor is on the order of 10 km (6 mi) wide. The surface topography of the Mississippi River Valley is basically flat, with minor amounts of wind-blown sand (Parkland Sand) providing 12 to 15 m (40 to 50 ft) of relief between the Mississippi River Valley and the adjoining upland area to the east. The elevation difference between the Mississippi River Valley and the eastern uplands is on the order of 45 m (150 ft).

During the preparation of the Preliminary Environmental Site Assessment (PESA) by the ISGS, a summary of the geology of the study corridor was prepared. The following text is excerpted directly from the PESA-ISGS 1040 (1999) FAP313 (U.S. Route 34):

Geology

Bedrock geology. From the western project limit (Carman Road) to about Gladstone, the project corridor is underlain by Upper Devonian-age shales of the New Albany Group. From Gladstone to a point slightly west of Monmouth, the project right-of-way is underlain by Mississippian-age (Lower Valmeyeran) limestones. In the area of the eastern project limit, the project right-of-way is underlain by Pennsylvanian-age sandstones, shales, and coals (with associated underclays) of the Abbott Formation.

Surficial geology. From the western project limit (Carman Road) to about Gladstone, drift thickness is between 30 and 60 m (100 and 200 ft). From Gladstone to the eastern project limits southwest of Monmouth, drift thickness varies sharply over short distances from less than 7.6 m (25 ft) to about 3 m (100 ft). Some outcrops are mapped in the Gladstone, Biggsville, and Kirkwood areas.

According to a stack-unit map of the area, surficial materials vary greatly over the 43.4 km (27 mi) extent of the project.

Between the western project limits (Carman Road) and (approximately) County Road (CR)900E (CH15), surficial materials consist of a thick unit [greater than 6 m (19.7 ft)] of modern alluvial sediments of the Cahokia Formation (formerly the Cahokia Alluvium). This unit overlies a thick unit [greater than 6 m (19.7 ft)] of stratified glaciofluvial sands and gravels of the Henry Formation.

Between (approximately) CR900E (CH15) and Illinois Route 164 (road to Gladstone), surficial materials consist of a thick unit [greater than 6 m (19.7 ft)] of stratified glaciofluvial sands and gravels of the Henry Formation.

From a point immediately east of Illinois Route 164, until roughly the eastern end of Bogus Hollow Road (Old U.S. 34), the project route rises onto a bluff composed of the following subsurface materials: A thick [(usually) greater than 6 m (19.7 ft)] unit of Peoria Silt (formerly Peoria Loess) and Roxana Silt overlies a thin [less than 6 m (19.7 ft) thick] unit of silty and clayey tills of the Glasford Formation. These units in turn lie directly upon rocks of Mississippian age, mostly limestones and some sandstones [in some areas, these rocks may be less than 6 m (19.7 ft) below the surface].

From (roughly) the eastern end of Bogus Hollow Road (Old U.S. 34), until (approximately) Illinois Route 94/Illinois Route 164, surficial materials consist of a thin [less than 6 m (19.7 ft) thick] unit of Peoria Silt (formerly Peoria Loess) and Roxana Silt overlying a thin [less than 6 m (19.7 ft) thick] unit of silty and clayey tills of the Glasford Formation. These units in turn lie directly upon a thick unit [less than 6 m (19.7 ft)] of tills of the Wolf Creek Formation.

From (roughly) Illinois Route 94/Illinois Route 164 to (approximately) the point where the alignment rejoins U.S. Route 34 about 1.95 km (1.2 mi) east of Biggsville, surficial materials consist of a thin [less than 6 m (19.7 ft) thick] unit of Peoria Silt (formerly Peoria Loess) and Roxana Silt overlying a thin [less than 6 m (19.7 ft) thick] unit of silty and clayey tills of the Glasford Formation. These units in turn lie directly upon rocks of Mississippian age, mostly limestones and some sandstones. In the eastern portion of this stretch, these rocks may be less than 6 m (19.7 ft) below the surface in some localized areas.

From 1.95 km (1.2 mi) east of Biggsville to the eastern project limits (U.S. Route 67), surficial materials consist of a thin [less than 6 m (19.7 ft) thick] unit of Peoria Silt (formerly Peoria Loess) and Roxana Silt overlying a thin [less than 6 m (19.7 ft) thick] unit of silty and clayey tills of the Glasford Formation. These units in turn lie directly upon a thick unit [less than 6 m (19.7 ft)] of tills of the Wolf Creek Formation.

In areas where the Pennsylvanian and Mississippian limestones are covered by only a thin veneer of Pleistocene deposits, karst topography may develop. At areas of limestone outcropping, caves and/or solution cavities may be formed. Caves and karst development have not been noted within the corridor. Undiscovered caves or solution cavities may be present at locations where the corridor intersects the Pennsylvanian/Mississippian bedrock, but may be closed by debris at the surface or deeply buried by Pleistocene sediments.

The topography of the uplands is controlled primarily by the flat-lying glacial drift. The topography has been modified by erosion since the retreat of the glaciers which once covered the area. The upland area is generally characterized by broad gently rolling hills with moderate slopes along the major streams (Old Tom Creek, South Henderson Creek, and Cedar Creek) and their tributaries.

The topography of the Mississippi River Valley is typical of a large river valley floodplain and is essentially flat with small hillocks of wind blown sand nestled below the upland bluffs.

Surficial deposits of the Peyton Formation (formerly the Peyton Colluvium) and the Lacon Formation were identified near the U.S. Route 34/Illinois Route 164 intersection (PESA-ISGS 1040, 1999) (see Appendix B). This area is the transition zone between the Mississippi River Valley floodplain and

the uplands. The Peyton Formation deposits are the result of creep and slope wash and the Lacon Formation deposits are the result of slumps and landslides (ibid) and, according to the author of the PESA, slopes within these materials may be prone to mass movement.

2.6.1.3 Mineral Resources

One commercial mineral producer is in operation within the project area. The Biggsville Quarry is located approximately 1.6 km (1 mi) west of Biggsville and is operated by the Cessford Company of Burlington, Iowa. The quarry extracts limestone from the Burlington/Keokuk limestone formation which is then processed for use as agricultural lime or as road building material. A small stone quarry, now inactive, is located on the east side of Illinois Route 164, approximately 0.8 km (½ mi) south of Gladstone. Minor amounts of sand are also extracted from a deposit located approximately 1.2 km (¾ mi) south of Gladstone on the east side of Illinois Route 164. The Henderson County State Conservation Area/Dutton Lake is the apparent site of a former sand and gravel production facility. Minor deposits of peat are reportedly present within the project corridor but the deposits are not large enough to be mined economically.

2.6.1.4 Soils

Two soil associations are predominant within the upland portion of the project corridor. These are the Sable-Muscatine association and the Tama-Muscatine association. The Sable-Muscatine association is characterized by nearly level, somewhat poorly to poorly drained, moderately permeable soils which formed in loess. These soils are found primarily on wide ridges and broad flats or in shallow depressions in the uplands. The association is made up of approximately 49 percent Sable soils, 34 percent Muscatine soils, and 17 percent soils of minor extent. Most of this association is used for cultivated crops. The second dominant soil association within the upland area is the Tama-Muscatine association. The Tama-Muscatine association is characterized by nearly level to strongly sloping, well drained to somewhat poorly drained, moderately permeable soils which formed in loess. These soils are found on ridges, side slopes, and flats. This association is composed of about 50 percent Tama soils, 30 percent Muscatine soils, and 20 percent soils of minor extent. As with the Sable-Muscatine association, the Tama-Muscatine association is used for cultivated crops. Both the Tama-Muscatine and Sable-Muscatine associations are well suited for the crops commonly grown in the area (USDA, 1998).

Within the Mississippi River Valley portion of the project corridor, the predominant soil associations are identified by NRCS as bottomland and sandy terraces. The soil types present within areas crossed by the recommended alternate include the Seaton silt loam, Sparta sands, Sawmill silty clay loam, Worthen silt loam, Littleton silt loam, Huntsville silt loam, and the Lomax and Disco soils. The Henderson County NRCS is currently updating the soils mapping and the soil survey.

The designation of soils as highly erodible is based largely on the land capability classification of the soil, as determined by the NRCS (see Section 4.3.3, Highly Erodible Soils). Highly erodible soils within the preferred alternative corridor include the Tama silt loam with slopes greater than 5 percent, the Fayette silt loam and Fayette silty clay loam with slopes greater than 5 percent, and the Hickory silt loam with slopes greater than 5 percent. The Tama silt loam and the Fayette silt loam/silty clay loam are both derived from loess, a fine-grained wind-deposited material. The Hickory silt loam is derived from glacial till (unsorted material deposited by glaciers) and may include minor amounts of loess.

The highly erodible soils are primarily found on the side slopes of steep-sloped areas or intermittent drainageways in the following areas:

- South of Henderson County Conservation area;
- Bogus Hollow Road area;
- West of Township Road (TR) 94;
- East and west of TR178;
- East and west of TR198; and
- South and east of Kirkwood.

2.6.2 Ecological Resources

2.6.2.1 Vegetation and Habitat

Terrestrial cover types were initially identified by integrating aerial photointerpretation, topographic mapping [i.e., U.S. Geological Survey (USGS)), and wetland mapping [i.e., National Wetland Inventory (NWI) and NRCS] into a geographical information system (GIS) database. This analysis was supplemented by performing literature reviews and qualitative field surveys to confirm the occurrence of each cover type. The designation of a particular parcel of land as a specific cover type was based on the dominant vegetative composition that occurred within that parcel. The cover types identified within the project corridor are depicted on Figure 2-5 and detailed in Table 2-12. Based on either abundance (e.g., cropland) or relative importance to wildlife, some of the cover types are discussed below.

Table 2-12. Cover Types Occurring within the U.S. Route 34 Project Corridor

Cover Type	Ha	Ac	Percent of Corridor
Cropland	11,090.3	27,403.6	81.7%
Woodland	718.8	1,776.1	5.3%
Old Field	553.2	1,366.9	4.1%
Farmstead/Residential/Manicured Lawn	406.5	1,004.5	3.0%
Pasture/Hayland	298.6	737.8	2.2%
Existing Road	223.0	551.0	1.6%
Public	100.3	247.8	0.7%
Industrial	61.9	152.9	0.5%
Wetlands	49.2	121.5	0.5%
Open Water	35.0	86.5	0.3%
Orchards	16.8	41.6	0.1%
Prairie	4.10	10.1	<0.1%
Total	13,557.70	33,500.30	100%

Source: Harding ESE, 2001.

Cropland

This habitat type is characterized by row crops, including corn, soybeans and wheat, and row crops cultivated for seed production. Crops are typically rotated on an annual basis and across seasons within the same field, and are used for human consumption or livestock feed. As the most common cover type, this habitat covers 11,090.3 ha (27,403.6 ac), or approximately 81.7 percent of the project corridor. Agriculture is discussed in more detail in Section 2.3.

Woodland

Wooded areas were found to consist mostly of mature hardwood species and comprise 718.8 ha (1,776.1 ac), or approximately 5.3 percent of the project corridor. Due to the conversion of the majority of available land to agricultural use, this habitat type occurs mainly along stream channels, on steep slopes, in ravines, and other areas not accessible by farm equipment. Common tree species include oak, hickory, basswood, elm, hackberry, Osage orange, and willow. One regionally exceptional natural area (Botanical Site #4), as described by the Illinois Natural History Survey (INHS) Noteworthy Vegetation Report (Handel, 1998), contains black ash and wild ginseng (Table 2-13).

Table 2-13. Noteworthy Plant Communities*

Site	Community Type	Status	Grade	Characteristics	Plants of Special Interest
1	Sand Hill Prairie	Statewide Significant Natural Area	C+	Several remnants combined as one, species diversity not high, but native species dominate.	None
2	Dry Sand Prairie	Statewide Exceptional Natural Area	C+	Occurs on a sand dune adjacent to Gladstone Lake, planted with pines and black locust, but possible to restore with proper management.	None
3	Sand Hill Prairie	Regionally Significant Natural Area	C to C-	Only area containing diverse mixture of prairie grasses and forbs, recently grazed.	*Delphinium carolinianum* (wild blue larkspur)-rare
4	Dry-Mesic Upland Forest/Seep	Regionally Exceptional Natural Area	C+	One of the best forest remnants found in the survey, seep is fair quality, relatively high number of native species.	*Fraxinus nigra* (black ash)-relatively uncommon *Panax quiniquefolius* (wild ginseng)-relatively uncommon
5	Dry-Mesic Prairie	Regionally Exceptional Natural Area	C-	Prairie remnant in need of management, grazed heavily in past, low diversity, exotic grasses encroaching.	None
6	Dry Sand Prairie (Blowout)	Regionally Exceptional Natural Area	C-	Disturbed in past, exotic grasses and weedy species dominate.	None

* As described in the INHS Noteworthy Vegetation Report (Handel, 1998).

Old Field

This habitat type is found in areas that were formerly farmed and/or cleared which now exhibit species compositions and habitat structures reflective of early successional vegetation communities. These areas are subject to colonization by grasses and forbs, cedars, and hardwood tree species in low, scattered densities. Vegetative composition is dominated by annual and perennial herbs, shrubs, and scattered, young tree species. Floral composition of the old field cover type is variable, depending

on the time elapsed since the abandonment of the previous land use. This habitat type represents 553.2 ha (1,366.9 ac) or approximately 4.1 percent of the project corridor.

Wetland

Wetland habitat in the project corridor can be found within various other cover types including agricultural, woodland, and old field. Vegetative composition is dominated by several hydrophytic grass, sedge, forb, shrub, and tree species. This habitat type represents 49.2 ha (121.5 ac), or approximately 0.5 percent of the project corridor. Wetlands are discussed in more detail in Section 2.9.

Prairie

Although prairie was the dominant community type prior to 1820's (Iverson, 1989), most of the area within the project has been converted to agriculture. Encroachment by invasive exotic species and a general lack of management have also contributed to the decline of this once-dominant community. Remnant prairie and savanna communities were found to exist in several fragmented areas totaling 4.1 ha (10.1 ac), or <0.1 percent of the project corridor. Common species include little bluestem, big bluestem, nodding wild rye, purple prairie clover, wild bergamot, and Ohio spiderwort. One sand hill prairie (Botanical Site #3) contains the rare wild blue larkspur.

The INHS conducted a botanical field survey to assess the natural quality of vegetative communities within the project corridor (Handel, 1998). To assess the quality of a given habitat, each area was evaluated according to White's methods (1978). A grade of C+ indicates a community that is recovering from past disturbance while a grade of C- indicates a community that is unlikely to recover due to ongoing disturbance. Six sites were documented which either have relatively undisturbed native plant communities or potential for restoration (Figure 2-6). Five of the six sites were prairie communities and are listed in Table 2-13.

2.6.2.2 Wildlife

As discussed in the previous section, the project corridor contains primarily row crop agriculture with small pockets of woodland, wetland, and prairie habitat. As such, the study corridor provides potential habitat cover for various common wildlife species.

Birds

In general, the project corridor tends to favor avian species that are more adaptable to human disturbance. An avian survey conducted by INHS (Amundsen and Enstrom, 1998) resulted in 82 species representing 33 taxonomic families that were present in the project corridor during the year surveyed (March 1, 1997 to February 28, 1998). The house wren and indigo bunting were among the species counted most often during the breeding season census, with the common grackle, black-capped chickadee, and American robin being most abundant during the fall, winter, and spring censuses, respectively. The great egret, has been recorded within 5 km (3 mi) of the project area and was also observed within the project corridor during the avian survey. Two active rookeries used by great egret and great blue heron populations were identified within 13 km (7.8 mi) of the project corridor. Since these species are known to forage within 30 km (18 mi) of their breeding grounds, areas within the project corridor could be utilized by these species as foraging sites. High quality breeding habitat for listed species was not identified within the project corridor.

Mammals

Although much of the project corridor consists of agriculture and developed land, the corridor provides suitable habitat for many mammalian species. INHS personnel conducted several surveys including mist netting for bats as well as small mammal trapping (INHS, 1998b). Mist netting was conducted along South Henderson Creek and bat fauna consisted of northern long-eared, big brown, red, and hoary bats. Small mammal trapping was conducted at four locations, three upland forest sites, and one grassland site on the nights of September 9-11, 1997. Northern short-tailed shrews (*Blarina brevicauda*) were caught in limited numbers in the upland forest locations and similar numbers of prairie voles (*Microtus ochrogaster*) were caught at the grassland location. Both of these species, however, are very abundant and highly distributed throughout Illinois and thus may be more common within the project corridor than these surveys suggest. The white-footed mouse (*Peromyscus leucopus*) was by far the most commonly captured small mammal and was captured at all four locations utilizing both upland and grassland habitats. INHS personnel observed 11 other mammal species through either direct observation or by roadkill or sign (e.g., scat, tracks, dens, or nests). The Virginia opossum (*Didelphis virginiana*) and raccoon (*Procyon lotor*), both habitat generalists, were among the most commonly observed species throughout the corridor. White-tailed deer (*Odocoileus virginianus*) were recorded throughout the corridor in forest, grassland, and agricultural habitats and several fox squirrels (*Sciurus niger*) were observed in the forest edge habitat.

Reptiles and Amphibians

Most of the project corridor lies within the Western Forest-Prairie Natural Division and is described as an area of level to rolling uplands, ravines, and floodplains (Schwegman, 1973). Four of Smith's (1961) Herpetofaunal Divisions occur within the corridor including Sand Area, Western Division Woodlands, Upper Mississippi Border, and Prairie. In 1997-1998, INHS personnel conducted several field surveys for amphibians and reptiles in an attempt to document occurrences within the study corridor (INHS, 1998c). Survey methods included visual encounters, roadkill collecting, frog and toad auditory surveys, and dipnetting and seining aquatic habitats. The surveys resulted in the identification of seven amphibian species and eight reptile species. Of the seven amphibian species observed, all were either common frog or toad species with the most abundant species being the cricket frog (*Acris crepitans*), American toad (*Bufo americanus*), and green frog (*Rana clamitans*). Of the eight reptile species observed, seven were relatively common snake species with one turtle species, the common snapping turtle (*Chelydra serpentina*), being observed seven different times. One snake species collected by Big River State Forest personnel, the western hognose (*Heterodon nasicus*), is state listed as threatened and is discussed in Section 2.6.2.4.

2.6.2.3 Federally Listed Species

The U.S. Fish and Wildlife Service (USFWS) was contacted for coordination on threatened and endangered species issues. They responded with two letters listing species that have been historically documented as occurring, or have potential to occur, in or near the project corridor (see Appendix B). Species listed as threatened or endangered by the USFWS that are known or have potential to occur within Warren and Henderson Counties are detailed in Table 2-14.

Table 2-14. Federally Listed Threatened and Endangered Species, Warren and Henderson Counties

Common Name	Scientific Name	Classification	Habitat	County
Bald Eagle	Haliaeetus leucocephalus	Threatened	Winter foraging and resting; along major rivers, night roosts in riparian areas	Henderson
Indiana Bat	Myotis soldalis	Endangered	Caves, mines; small stream corridors with well developed riparian woods; upland forests (foraging habitat)	Henderson
Higgins' Eye Pearly Mussel	Lampsilis higginsii	Endangered	Mississippi River; Rock River to Steel Dam	Henderson
Eastern Prairie Fringed Orchid	Platanthera leucophaea	Threatened	Mesic to wet prairies	*
Mead's Milkweed	Asclepias meadii	Threatened	Virgin prairies	*

* Wherever prairie remnants are encountered.

Based upon INHS field work, the following is a discussion of federal species that may occur in the project area.

Bald Eagle

Potential exists for the occurrence of the bald eagle within the project corridor, as this species tends to use major rivers and associated riparian areas for foraging, resting, and night roosting. The western end of the project corridor approaches the Mississippi River and thus could provide suitable foraging and roosting habitat for this species. Neither individuals nor high-quality breeding habitat were identified during any of the surveys performed within the project corridor. The proposed project will not impact the bald eagle.

Plants

Mead's milkweed and the eastern prairie fringed orchid are both listed by the USFWS as threatened. Both plant species occur in prairie habitat although Mead's milkweed occurs in dry prairies whereas the eastern prairie fringed orchid prefers mesic to wet prairies. While remnant dry prairie communities still exist within the project corridor, Mead's milkweed was not identified during the INHS survey for threatened and endangered flora probably due to lack of sufficient habitat. Neither individuals nor appropriate habitat was identified during the INHS field surveys for the eastern prairie fringed orchid (INHS, 1998a). The proposed project will not impact either Mead's milkweed or eastern prairie fringed orchid.

Indiana Bat

Indiana bats typically congregate in caves or mines for hibernation, but are more widely dispersed along wooded riparian areas during the summer. INHS personnel conducted mist netting at two locations on South Henderson Creek in Henderson County during July and August 1997. The two survey locations were chosen based on the potential for suitable habitat.

A colony of Indiana bats was documented in Henderson County in 1989 (Gardner et al., 1991) near Jink's Hollow Creek. The project corridor area is approximately 6 km (3.73 mi) south of that location. Sampling results for both locations included the collection of five individuals representing four species of bats, including a juvenile male hoary bat (*Lasiurus cinereus*), two northern long-eared bats (*Myotis septentrionalis*), a post lactating female red bat (*L. borealis*), and an adult male big brown bat (*Eptesicus fuscus*).

There is no suitable habitat for maternity colonies of Indiana bats within the project corridor. Suitable foraging habitats were located along South Henderson Creek. However, the proposed project does not affect South Henderson Creek. The proposed project will not impact the Indiana bat.

Higgins' Eye Pearly Mussel

The Higgins' eye pearly mussel is listed by both the USFWS and the State of Illinois as endangered. According to the USFWS recovery plan, this freshwater clam is found only in the Mississippi River, the St. Croix River in Wisconsin, and the Rock River in Illinois below the first dam. As such, there is no suitable habitat for this species in the project area. The proposed project will not impact the Higgins' eye pearly mussel.

No other species listed as threatened or endangered by the USFWS are likely to occur in the project area.

2.6.2.4 State Listed Species

Field surveys and the Illinois Department of Natural Resources database lists the following species known to occur in the vicinity of the project area [Illinois Department of Natural Resources (IDNR) correspondence dated 6/24/96 and 6/18/99].

Table 2-15. Illinois Listed Endangered and Threatened Species Potentially Occurring in the Project Corridor

Common Name	Scientific Name	Classification	Habitat
Brown creeper	Certhia americana	Threatened	Floodplain forest, deciduous and mixed
Western hognose snake	Heterodon nasicus	Threatened	Dry prairie areas, especially sandy ones
Illinois mud turtle	Kinosternon flavescens	Endangered	Sand areas that are interspersed with semi-permanent or permanent ponds and sloughs
River otter	Lutra canadensis	Endangered	From 33 counties, riparian habitat with extensive woodlands, good water quality, and the presence of suitable den sites, and open water in winter

Source: IDNR, 1998.

Brown Creeper

Brown creepers occupy deciduous and mixed woodlands with floodplain forest apparently being its primary habitat. This small migratory bird will use a variety of tree species for foraging and breeding but a dense, relatively mature stand containing some dead trees is important in breeding. Dead trees with peeling bark are used for nesting sites. Brown creepers were observed at various woodland sites within the project corridor during the fall, winter, and spring avian censuses. This common winter resident will not be impacted by the proposed project.

Western Hognose Snake

The western hognose snake is state listed as threatened. This snake is restricted to sand areas and adjacent woodlots along the upper Mississippi River, the Green River, and the Illinois River. Personnel of Big River State Forest near Gladstone Lake Conservation Area collected one western hognose snake in 1997 after an apparent roadkill. The specimen was deposited in the INHS Amphibian and Reptile Collection. Park personnel claim to have seen one or two western hognose snakes each year near Gladstone Lake. No direct observations were made during any of the field activities of this species. The proposed project will not impact the western hognose snake.

Illinois Mud Turtle

The Illinois mud turtle (*Kinosternon flavescens)* is listed as state endangered. This small turtle is found in temporary to permanent ponds and backwaters generally associated with sand prairies and other sandy habitats. The turtle has been found in the Illinois, Mississippi, and Green River drainage systems. Historic records document the occurrence of this species in the area of Gladstone Lake, Henderson County State Conservation Area, 1982 National Heritage Databases (NHD). Two individuals were trapped at the same location in 1979 and one in 1982. Recent surveys have failed to yield any Illinois mud turtles at this location. This species was not observed in the project area during field surveys. The proposed project will not impact this species.

River Otter

The river otter (*Lontra canadensis*) is listed as state-endangered in the state of Illinois and is considered to be widely distributed in the state (Herkert, 1992). Efforts in determining the occurrence of this species within the project corridor included records review, field surveys, or habitat assessments. The only suitable habitat for river otters within the corridor was determined to be South Henderson Creek. However, the overall length of the creek and the heavy vegetation along the creek banks made observation of river otter sign difficult. The survey found no evidence for the presence of river otters within the project corridor. The proposed project will not impact the river otter.

2.7 Water Quality/Resources

2.7.1 Surface Water

Surface water resources within the U.S. Route 34 project corridor include ditches, intermittent streams, perennial streams, and impoundments (Figure 2-7) in the Mississippi North Central River watershed. The largest hydrological feature within the region of the project area is the Mississippi River; however, the project corridor is located to the east and should not affect the Mississippi River in any way. Predominant land use in the project corridor is agricultural cropland or pastureland with subsurface tile drains that empty into ditches, creeks, and streams.

Intermittent streams, including the drainage from Citizens Lake, a tributary to Cedar Creek, and numerous tributaries of South Henderson Creek, are typically shallow with narrowly meandering channels and highly erodible stream banks. High flows generally occur in the spring and low flows occur in late summer. Riparian habitat is generally limited to a small buffer strip of trees and shrubs such as cottonwood, black willow, silver maple, and false nettle. These narrow riparian buffer strips have led to accumulations of heavy silt loads and nutrients during high runoff events. Stream widths are generally less than 1.5 m (5 ft) with depths less than 0.3 m (1 ft). Fish community diversity is typically low for these streams due to the lack of sufficient habitat.

Permanently flowing streams within the project area include the Carthage Lake drainage ditch, P.D. Creek, an unnamed tributary to the Mississippi River (locally known as Lone Tree Creek), Old Tom Creek, South Henderson Creek, and Markham Creek. South Henderson Creek is the primary perennial stream within the project corridor. It flows generally west through much of the U.S. Route 34 project corridor into Henderson Creek, which eventually flows into the Mississippi River. Stream characteristics for South Henderson Creek include channel widths up to 6.1 m (20 ft), depths up to 1.5 m (5 ft), substrates ranging in size from silt to gravel, and abundant woody debris. South Henderson Creek has over 30 tributaries within the project corridor that drain primarily agricultural and pasture land. Markham Creek, on the eastern end of the project corridor, originates from intermittently

flowing drainages south of 192 Avenue due east of Monmouth. Flow is to the north, meandering past the Monmouth Airport, eventually draining into Cedar Creek.

Surface waters in the project corridor are governed by the General Use Water Quality Standard. South Henderson Creek and Markham Creek are the only surface waters in the project corridor to be assessed for water quality by the Illinois Environmental Protection Agency (IEPA). Both Markham Creek and portions of South Henderson Creek within the project area were identified as waters not meeting the "overall" and "aquatic life" designated use codes according to the annual *Illinois Water Quality Report* (IEPA, 2000). These water bodies are impaired with low dissolved oxygen levels, elevated nutrient levels, and siltation problems. Sources of the problems include municipal point sources and, in the case of South Henderson Creek, surrounding agricultural practices. Both Markham Creek and portions of South Henderson Creek within the project area have been identified as water quality limited waters under Section 303(d) of the Clean Water Act (IEPA, 1998). Therefore, it is anticipated that IEPA will establish total maximum daily loads (TMDL) for these streams.

Permanent and semi-permanent ponds, small lakes, and other impounded areas also occur in the project corridor with Gladstone Lake and Citizens Lake being the most predominant. These resources are typically small and have been, or are currently being used as, water supply for domestic livestock, recreation (Gladstone Lake), and irrigation. Gladstone Lake is located near the western half of the project corridor and offers the best angling lake access for local anglers. Gamefish species inhabiting Gladstone Lake include largemouth bass, channel catfish, bluegill, redear sunfish, and both black and white crappie.

In 1997, INHS personnel conducted surveys for fishes, mussels, and aquatic macroinvertebrates in the aquatic habitats associated with the project corridor between Gulfport and Monmouth, Henderson and Warren counties, Illinois.

Fish surveys were performed at seven sites within the project corridor including two sites in the Carthage Lake Drainage Ditch, two sites at South Henderson Creek, Markham Creek, Bogus Hollow Creek, and an unnamed tributary to Cedar Creek. The surveys resulted in the collection of 24 species of fish representing seven families with the most abundant species being the bluntnose minnow, creek chub, and Johnny darter. According to INHS personnel, all the fish species collected are considered common inhabitants of western Illinois streams. No species listed as either endangered or threatened at the state or federal level were collected or observed (INHS, 1999).

Three common species of mussels, plain pocketbook, fragile papershell and giant floater, were collected during the INHS survey but none were found alive. Unionids were collected at only two of seven sites examined – Carthage Lake Drainage Ditch and South Henderson Creek. There were no live or dead shells found from species of special concern at any of the survey sites (INHS, 1999). Most streams sampled were small and likely intermittent during low flow years, and most contained heavy loads of silt and were historically channelized. As a result, the aquatic habitat surveyed within the project corridor was of poor quality for mussels.

Aquatic macroinvertebrates were also surveyed at six sites within the project corridor including two unnamed tributaries to Cedar Creek, Bogus Hollow Creek, Carthage Lake Drainage Ditch, Markham Creek, and South Henderson Creek. The surveys resulted in the collection of various gastropods, annelids, crustaceans, numerous species of aquatic insects, and several other aquatic macroinvertebrate species. Most of the specimens collected are described as common species in permanent, clear rocky or muddy organic streams in Illinois. The survey did not identify any

threatened or endangered macroinvertebrate species and none are thought likely to occur in the project corridor (INHS, 1999).

2.7.2 Groundwater

There are four drinking water resources within the project corridor including: (1) sand and gravel deposits within the Mississippi River Valley and glacial drift; (2) shallow bedrock aquifers within the Burlington-Keokuk limestone and within the Silurian dolomite; (3) deep bedrock aquifers within dolomite and sandstone of Ordovician and older rocks; and (4) the Mississippi River. Sole source aquifers (SSAs) are defined by the USEPA [Safe Drinking Water Act, Section 1424(e)] as an aquifer which supplies more than 50 percent of the drinking water for the area which overlies the aquifer. Based on information found at the USEPA's Office of Water Sole Source Aquifer Protection Program web page (*www.epa.gov/safewater/swp/sumssa.html*), no SSAs are present within Illinois. (The page was last updated on July 6, 2001.)

Groundwater is the primary source of drinking water and agricultural irrigation water in the area. Many of the private residences withdraw drinking water from the sand and gravel deposits of glacial drift and the unconsolidated river valley deposits, as do many of the irrigation wells. Groundwater from the shallow and deep bedrock aquifers is utilized as a public water supply for municipalities and state institutions within the project corridor. Only the Gulfport public water supply system utilizes the sand and gravel deposits within the Mississippi River Valley.

The ISGS has recorded 49 water wells within 1.6 km (1 mi) of the existing U.S. Route 34. These records are based on reports submitted by well drillers and may include wells which are no longer in use. The majority of the upland wells are finished in limestone or unidentified rock deposits at depths ranging from 25 to 250 m (83 to 820 ft). Several upland wells are finished in glacial drift deposits at depths ranging from 30 to 46 m (100 to 150 ft). The wells within the Mississippi River Valley are finished in unconsolidated sand and gravel deposits at depths ranging from 12 to 32 m (40 to 105 ft).

The potential for stratigraphic sequences to prevent contamination of groundwater resources by surface and near surface sources has been estimated for all areas of Illinois (Berg et al., 1984). A state map produced as part of that study was used to evaluate the U.S. Route 34 corridor. The ability of the local surface deposits to protect groundwater supplies ranges from very good to poor. Aquifers are best protected from contamination where uniform, relatively impermeable, silty or clayey tills greater than 6.1 m (20 ft) thick blanket relatively impermeable bedrock. Such deposits occur in most of the upland areas within the project corridor with the exception of the area immediately adjacent to Old Tom Creek and South Henderson Creek, where the bedrock is less than 6.1 m (20 ft) from the surface. Relatively high potential for contamination of aquifers occurs where the surficial deposits are alluvium. The alluvial deposits occur primarily within the Mississippi River Valley with minor alluvial deposits occurring along Old Tom Creek and Henderson Creek.

2.8 Floodplains

All available Flood Insurance Rate Maps (FIRMs) from the Federal Emergency Management Agency (FEMA) for the project area were obtained and reviewed including the revised FIRM for Henderson County dated March 22, 1999. These maps indicate that Zone A (100-year) floodplains occur in the project corridor and are associated with the Mississippi River and South Henderson Creek (see Figure 2-7). Zone B floodplains, areas protected by levees from the base flood, are also associated with the Mississippi River within the project corridor. There are no FEMA floodways within the project corridor.

Some parts of the western portion of the project corridor are located within the Mississippi River Zone A 100-year floodplain. Most of this has been cleared and is currently used for agricultural purposes including cropland and pasture. There is a small 100-year floodplain associated with South Henderson Creek consisting of a narrowly wooded riparian zone used for agricultural purposes.

Natural river floodplains are important resources with numerous natural and beneficial values. One primary function is to diminish flooding impacts downstream by dissipating excess water over a large area. Floodplains decrease soil erosion by reducing flow velocity and retaining water-carried silt. Since vegetation and soil trap sediments, pollutants, and excess nutrients, floodplains enhance water quality by acting as a natural water filtration system.

Undisturbed floodplains typically consist of unique flora and fauna habitats. Consequently, floodplain ecosystems are areas of high biodiversity providing a number of fish and amphibian species with spawning areas and migratory birds with resting, feeding, and nesting habitats. The western section of the project corridor consists of floodplains located within the Mississippi River flyway, an important Midwest migratory corridor.

The project corridor is protected from frequent flooding conditions from the Mississippi River by a levee system built prior to 1920 by Henderson County Drainage Districts 1 and 2. Beginning south of Gulfport, the levee extends northeast for 24.5 km (15.2 mi) to Gladstone. Improvements were made to the levee in the late 1920s and 1960s [U.S. Army Corps of Engineers (USACE), 1991]. The levee is certified to withstand a 100-year flood event and has not been breached by previous floods since its inception (personal communication, Jones, USACE-Rock Island District, 3/17/99). However, in 1995 the floodplains located within the project area were flooded (interior flooding) due to water seepage from the Mississippi River and groundwater saturation (personal communication, Hennenfent, Henderson County Drainage District Attorney, 4/29/99).

A system of drainage ditches occurs within the project corridor that were also built by the Henderson County Drainage Districts 1 and 2 in 1912. The purpose of these ditches is to drain excess water to a pumping station just south of Gulfport. At Gulfport, the excess water is pumped into the Mississippi River. Without the drainage system in place, prolonged flooding of the floodplain area would occur as a result of surface water and/or groundwater seepage. After the flood of 1965, the drainage ditches were rebuilt and improved by Henderson County Districts 1 and 2 (personal communication, Hennenfent).

2.9 Wetlands

The INHS examined the project corridor area to determine wetland locations and boundaries using United States Geological Survey (USGS) topographic maps, NWI mapping, aerial photographs, and field reconnaissance (Tessene and Machung, 1998.) Ninety-four jurisdictional wetland sites comprising 49.21 ha (121.60 ac) were identified within the project corridor. These wetlands are summarized by type and area in Table 2-16.

Table 2-16. Type and Area of Wetlands within the U.S. Route 34 Project Corridor

Wetland Type	Number	Total Size	
		Hectares	Acres
Farmed Wetland/Wet Meadow	2	0.27	0.67
Floodplain Forest-Wet Meadow/Seep	12	5.09	12.58
Marsh-Lakeshore/Wet Shrubland/Pond	6	18.21	45.0
Pond-Marsh/Wet Meadow	33	17.22	42.55
Sedge Meadow-Seep/Wet Shrubland	13	2.11	5.21
Wet Meadow-Seep/Pond	26	5.25	12.97
Wet Shrubland	2	1.06	2.62
Total	94	49.21	121.60

Section 404 of the Clean Water Act requires the issuance of a USACE permit for dredging or filling in wetlands. For the purposes of complying with the Section 404 program, the federal government endorses two separate wetland delineation manuals, the 1987 USACE Wetlands Delineation Manual and the National Food Security Act Manual - Third Edition. A 1994 Federal Memorandum of Agreement (MOA) between the U.S. Department of Defense, U.S. Department of Interior, USEPA, and U.S. Department of Agriculture defines situations to which these two manuals may be applied. It requires the use of the 1987 USACE Wetland Delineation Manual (with current national USACE guidance) by all federal resource agencies on non-agricultural land for Section 404 purposes. When determinations or delineations's are made on agricultural lands for Section 404 purposes, the National Food Security Act Manual-Third Edition must be used.

The initial review of existing mapping resources was followed by field verification conducted to confirm the existence or absence of mapped wetlands, and to identify additional wetlands which had not been previously mapped. Wetland boundaries were determined in accordance with the USACE Wetlands Delineation Manual (1987). In order to comply with Clean Water Act (CWA) regulations, the project corridor area was evaluated by the INHS (Tessene and Machung, 1998) for the presence of jurisdictional wetlands during the period of May through October 1997.

In order to be considered a regulated or jurisdictional wetland, an area must possess three criteria required by the USACE Wetland Delineation Manual (i.e., wetland hydrology, hydric soils, and a prevalence of hydrophytic vegetation). Of the initial 138 sites, 94 were confirmed as jurisdictional wetlands (see Figure 2-7). These wetlands are typical for this region of Illinois and are summarized by type and area in Table 2-17.

Table 2-17. Summary of Wetland Characteristics in the U.S. Route 34 Project Area

Wetland Number	Wetland Type	Classification NWI	Classification NRCS	Predominant Vegetation	Basin Structure	FQI	Size Ha	Size Ac
2	pond	not mapped	not mapped	*Equisetum arvense* *Phalaris arundinacea* *Typha latifolia*	impoundment in drainage	6.00	0.12	0.29
3	wet meadow/seep	not mapped	not mapped	*Equisetum arvense* *Impatiens capensis* *Ranunculus septentrionalis*	located in a small ravine	11.60	0.06	0.15
4	pond	PFO1A	not mapped	*Phalaris arundinacea*	impoundment in drainage	7.80	0.21	0.51
5	floodplain forest	PFO1A		*Acer saccharinum* *Boehmeria cylindrica* *Impatiens capensis*	located in abandoned stream channel	10.20	0.03	0.07
6	pond	not mapped	not mapped	*Phalaris arundinacea* *Scirpus atrovirens*	impoundment in drainage	8.30	0.09	0.21
7	wet meadow/pond	PEMAh	W	*Phalaris arundinacea* *Potamogeton foliosus*	impoundment in drainage	9.20	0.09	0.21
10	wet meadow	PEMAf	not mapped	*Aster simplex* *Hordeum jubatum*	closed depression	6.30	0.07	0.16
12	wet meadow	PSS1Ch	W	*Aster simplex* *Glyceria striata* *Impatiens capensis* *Phalaris arundinacea*	groundwater seep in pasture near steam	17.20	0.20	0.50
14	sedge meadow/seep	PEMA	W	*Carex stipata* *Eleocharis erythropoda* *Typha latifolia*	groundwater seep in pasture near steam	13.90	0.18	0.46
15	pond	PUBGh	W	*Salix nigra* *Salix exigua* *Ambrosia trifida*	impoundment in drainage	3.60	0.07	0.16
18	seep/sedge meadow	not mapped	not mapped	*Carex vulpinoidea* *Glyceria striate*	located in a small ravine	12.00	0.03	0.08

Table 2-17. Summary of Wetland Characteristics in the U.S. Route 34 Project Area

Wetland Number	Wetland Type	Classification NWI	Classification NRCS	Predominant Vegetation	Basin Structure	FQI	Size Ha	Size Ac
				Impatiens capensis				
20	wet shrubland	PEMAh	W	*Salix nigra*	depressional area along a drainageway	6.90	0.68	1.67
				Phalaris arundinacea				
22	pond	PUBGh	AW	*Phalaris arundinacea*	impoundment along a drainageway	1.40	1.26	3.11
23	pond	PUBGh	AW	*Acorus calamus*	impoundment along a drainageway	10.10	0.61	1.51
				Phalaris arundinacea				
				Potamogeton foliosus				
24	wet meadow/seep	PEMCh	W	*Acorus calamus*	located along a stream	6.00	0.03	0.07
27	wet meadow	PEMA	not mapped	*Agrostis alba*	base of slope near a small stream	3.10	0.02	0.04
				Bromus tectorum				
				Hordeum jubatum				
31	pond	PUBGh	AW	*Lemna minor*	impoundment	4.60	0.20	0.48
				Phalaris arundinacea				
32	wet meadow	PEMC	W	*Hordeum jubatum*	located in an old stream channel	4.50	0.22	0.55
				Phalaris arundinacea				
				Polygonum pensylvanicum				
35	pond/wet meadow	PUBGh	AW	*Echinochloa muricata*		2.00	0.10	0.26
				Polygonum persicaria				
37	pond	PUBGh	AW	*Phalaris arundinacea*	impoundment	6.90	0.18	0.44
				Potamogeton foliosus				
				Typha angustifolia				
38	wet meadow	PUBFh	W	*Agrostis alba*	impounded depression along a drainageway	0.00	0.03	0.07
				Hordeum jubatum				
				Phalaris arundinacea				
39	pond	PUBGh	W	*Polygonum pensylvanicum*	impoundment in a shallow ravine	5.40	0.10	0.24
				Rumex crispus				
				Veronica peregrina				
40	sedge meadow	PEMC	W	*Acorus calamus*	groundwater seep along stream	9.20	0.68	1.67
				Carex vulpinoidea				
				Phalaris arundinacea				

Table 2-17. Summary of Wetland Characteristics in the U.S. Route 34 Project Area

Wetland Number	Wetland Type	Classification NWI	Classification NRCS	Predominant Vegetation	Basin Structure	FQI	Size Ha	Size Ac
41	wet meadow	PEMCh	W	*Phalaris arundinacea*		2.30	0.06	0.15
44	pond	PUBGh	AW	*Lemna minor* *Phalaris arundinacea* *Potamogeton foliosus*	impoundment along a drainageway	6.00	0.46	1.14
45	sedge meadow	PUBGh	AW	*Bidens cernua* *Carex annectans* *Leersia oryzoides* *Polygonum hydropiper*	located along a drainageway in a pasture	8.00	0.05	0.12
46	pond/wet meadow	PUBGh	AW	*Phalaris arundinacea*	impoundment	8.70	2.37	5.86
46a	floodplain forest	not mapped	W	*Morus alba* *Ulmus americana* *Impatiens capensis* *Phalaris arundinacea* *Urtica dioica*	depressional area along a stream	14.90	0.14	0.34
47	pond	PUBGh	AW	*Ceratophyllum demursum* *Lemna minor* *Phalaris arundinacea*	impoundment	11.20	2.85	7.04
48	wet meadow	PEMCh	W	*Phalaris arundinacea*		6.80	0.03	0.09
49	sedge meadow	not mapped	not mapped	*Carex annectans* *Juncus dudleyi* *Scirpus atrovirens*		9.70	0.01	0.03
52	sedge meadow	not mapped	not mapped	*Carex annectans* *Glyceria striata*	depression along a drainageway	8.00	0.05	0.13
54	pond/marsh	PUBGh	AW	*Typha angustifolia*	excavated depression along a drainageway	8.50	0.56	1.38
56	pond	PUBGh	AW	*Salix nigra* *Ulmus americana* *Cornus drummondii*	impounded ravine	8.10	0.23	0.57
57	wet shrubland	not mapped	not mapped	*Acer saccharinum* *Populus deltoides* *Phalaris arundinacea*	low area near a stream	13.00	0.35	0.85

Table 2-17. Summary of Wetland Characteristics in the U.S. Route 34 Project Area

Wetland Number	Wetland Type	Classification NWI	Classification NRCS	Predominant Vegetation	Basin Structure	FQI	Size Ha	Size Ac
58	floodplain forest	PEMA	FW	*Urtica dioica* *Acer saccharinum* *Laportea canadensis* *Pilea pumila*	low area at base of slope	10.60	0.09	0.22
59	pond	PUBGh	AW	*Cornus drummondii* *Ceratophyllum demursum* *Lemna minor*	impoundment	9.00	0.29	0.73
60	sedge meadow	not mapped	not mapped	*Bidens cernua* *Carex annectans* *Polygonum hydropiper*	groundwater seep along a drainageway	8.90	0.14	0.34
61	floodplain forest	PUBGh	AW	*Salix nigra* *Phalaris arundinacea* *Urtica dioica*	impoundment in drainageway	8.80	0.10	0.26
62	wet meadow	PUBGh	AW	*Bidens frondosa* *Gleditsia triacanthos* *Leersia oryzoides* *Polygonum pensylvanicum*	impoundment	7.70	0.07	0.17
63	pond	not mapped	not mapped	*Phalaris arundinacea* *Potamogeton foliosus* *Potamogeton nodosus*	impounded drainageway	11.30	1.97	4.87
64	pond	not mapped	not mapped	*Echinochloa muricata* *Leersia oryzoides* *Hordeum jubatum*	impoundment	6.10	0.59	1.45
65	sedge meadow	not mapped	not mapped	*Carex annectans* *Eleocharis erythropoda* *Scirpus atrovirens*	located along a drainageway near a pond	8.50	0.08	0.20
66	wet meadow	not mapped	not mapped	*Phalaris arundinacea*	low area along a drainageway	5.70	0.03	0.07
67	marsh	not mapped	not mapped	*Glyceria striata* *Scirpus atrovirens* *Typha latifolia*	located along a low drainageway	13.80	0.08	0.20
68	pond	PUBGh	AW	*Scirpus atrovirens*	impoundment along a drainageway	6.40	0.14	0.34

Table 2-17. Summary of Wetland Characteristics in the U.S. Route 34 Project Area

Wetland Number	Wetland Type	Classification NWI	Classification NRCS	Predominant Vegetation	Basin Structure	FQI	Size Ha	Size Ac
69	wet meadow	PUBGh	AW	*Typha latifolia* *Cyperus esculentus* *Echinochloa muricata* *Phalaris arundinacea*	located along an impounded drainageway	7.50	0.15	0.36
70	floodplain forest	not mapped	not mapped	*Acer negundo* *Acer saccharinum* *Sambucus canadensis* *Aster ontarionis* *Phalaris arundinacea* *Sanicula gregaria*	located along a low drainageway	16.20	0.03	0.08
71	pond	PUBGh	AW	*Ceratophyllum demursum* *Cyperus esculentus* *Echinochloa muricata*	impoundment	8.50	1.00	2.47
72	sedge meadow	not mapped	not mapped	*Carex annectans* *Eupatorium perfoliatum* *Scirpus atrovirens*	groundwater seepage along a drainageway	11.80	0.04	0.11
73	wet meadow	not mapped	not mapped	*Echinochloa muricata* *Hordeum jubatum*	located along a drainageway	4.70	0.07	0.17
75	wet meadow	not mapped	not mapped	*Phalaris arundinacea* *Scirpus atrovirens*	low area along a drainageway	10.60	0.10	0.26
76	sedge meadow/ wet shrubland	not mapped	not mapped	*Fraxinus nigra* *Carex trichocarpa* *Glyceria striata* *Impatiens capensis* *Pilea pumila*	located along a drainageway	22.00	0.52	1.28
78	floodplain forest	not mapped	W	*Salix nigra* *Ulmus americana* *Elymus virginicus* *Laportea canadensis*	located in alow drainageway along a stream	9.90	0.14	0.34

Table 2-17. Summary of Wetland Characteristics in the U.S. Route 34 Project Area

Wetland Number	Wetland Type	Classification NWI	Classification NRCS	Predominant Vegetation	Basin Structure	FQI	Size Ha	Size Ac
81	pond	PUBGh	AW	*Phalaris arundinacea*	impoundment	7.30	1.39	3.43
82	sedge meadow	not mapped	not mapped	*Phalaris arundinacea* *Scirpus atrovirens*	located along a low drainageway	11.90	0.08	0.20
83	pond	PUBGh	AW	*Lemna minor* *Phalaris arundinacea*	impoundment in a drainageway	2.70	0.05	0.11
84	pond	PUBGh	AW	*Echinochloa muricata* *Leersia oryzoides* *Lemna minor* *Potamogeton foliosus*	impoundment	6.70	0.28	0.68
85	floodplain forest/seep	not mapped	not mapped	*Ulmus americana* *Cryptotaenia canadensis* *Phalaris arundinacea*	located at base of slope near stream	8.80	0.15	0.37
86	wet meadow	PEMA	not mapped	*Amaranthus tuberculatus*	depression along a drainageway	6.50	0.03	0.09
87	wet meadow	PEMCh	W	*Ambrosia trifida* *Polygonum hydropiper* *Polygonum pensylvanicum*	low, level area that may have been scraped	2.80	0.15	0.37
89	floodplain forest/ wet meadow	PEMC	W	*Acer saccharinum* *Salix nigra* *Phalaris arundinacea* *Scirpus atrovirens* *Verbena hastata*	partially located in an old stream channel	11.60	0.70	1.74
90	pond	PUBGh	AW	*Leersia oryzoides* *Lemna minor* *Phalaris arundinacea*	impounded drainageway	9.60	0.25	0.62
91	marsh	not mapped	not mapped	*Leersia oryzoides* *Sagittaria latifolia*	groundwater seep along a drainageway	11.30	0.24	0.60
92	pond	not mapped	not mapped	*Leersia oryzoides*	excavated depression	4.50	0.22	0.53

Table 2-17. Summary of Wetland Characteristics in the U.S. Route 34 Project Area

Wetland Number	Wetland Type	Classification NWI	Classification NRCS	Predominant Vegetation	Basin Structure	FQI	Size Ha	Size Ac
93	sedge meadow	not mapped	not mapped	*Polygonum lapathifolium* *Carex vulpinoidea* *Leersia oryzoides* *Polygonum hydropiper* *Scirpus atrovirens*	located in low ground along a stream	11.60	0.09	0.22
94	wet shrubland wet meadow	not mapped	not mapped	*Salix nigra* *Impatiens capensis* *Phalaris arundinacea*	located in a depression along a drainageway	10.30	0.03	0.08
95	sedge meadow/seep	not mapped	not mapped	*Carex hystricina* *Impatiens capensis* *Phalaris arundinacea*	groundwater seep near a stream	17.00	0.16	0.39
96	pond	not mapped	AW	*Bidens cernua* *Echinochloa muricata*	impoundment	2.70	0.20	0.50
97	pond	PUBGh	AW	*Polygonum persicaria* *Polygonum punctatum*	excavated depression along a drainageway	5.00	0.08	0.19
98	pond	PUBGh	AW	*Polygonum lapathifolium* *Wolffia columbiana*	impoundment along a drainageway	5.30	0.08	0.20
100	pond	PUBGh	AW	*Lemna minor* *Polygonum persicaria*	impounded ravine	5.40	0.28	0.68
101	wet meadow/seep	not mapped	not mapped	*Bidens comosa* *Leersia oryzoides* *Polygonum punctatum*	located along a drainageway at base of ravine	12.00	0.21	0.51
102	pond	not mapped	not mapped	*Echinochloa muricata* *Polygonum hydropiper*	located in a shallow excavated depression	1.50	0.03	0.07
105	wet meadow	not mapped	W	*Impatiens capensis* *Phalaris arundinacea*	located in a drainageway	14.10	0.12	0.30
106	pond	PUBGh	AW	*Morus alba* *Ulmus americana*	impounded ravine	6.60	0.40	1.00

Table 2-17. Summary of Wetland Characteristics in the U.S. Route 34 Project Area

Wetland Number	Wetland Type	Classification NWI	Classification NRCS	Predominant Vegetation	Basin Structure	FQI	Size Ha	Size Ac
109	floodplain forest	not mapped	not mapped	*Lemna minor* *Platanus occidentalis* *Ulmus americana* *Salix nigra* *Leersia oryzoides* *Sagittaria latifolia*	impounded ravine	13.00	0.28	0.68
110	pond/wet meadow	not mapped	not mapped	*Ulmus americana* *Cyperus esculentus* *Equisetum arvense*	impounded ravine	5.70	0.07	0.18
111	pond	PEMCh	AW	*Ulmus americana* *Lemna minor*	impounded ravine	12.20	0.49	1.20
112	floodplain forest wet meadow	PEMCh	not mapped	*Salix nigra* *Ulmus americana* *Agrostis alba* *Aster lateriflorus* *Impatiens capensis*	level area at the base of a long ravine	18.20	0.62	1.54
115	wet meadow	PUBGh	W	*Echinochloa muricata*	impoundment	2.60	0.30	0.75
116	wet meadow	not mapped	not mapped	*Polygonum hydropiper* *Polygonum persicaria*	impoundment	6.10	0.11	0.27
119	floodplain forest	P(SS/FO)1	FW	*Acer saccharinum* *Fraxinus pennsylvanica* *Platanus occidentalis* *Geum canadense*	depressional area in floodplain of Mississippi River	14.60	2.43	6.01
120	marsh	PSS1Cx	W	*Carex scoparia* *Polygonum punctatum* *Scirpus pungens*	shallow excavation	14.20	0.16	0.40
121	lakeshore/marsh	L1UBHx	not mapped	*Potamogeton sp.* *Scirpus validus*	located along the shore of Gladstone Lake	11.10	4.84	11.95
124	marsh/wet	P(EM/SS1)C	W	*Salix exigua*	impounded marsh in the Mississippi	9.60	11.23	27.74

Table 2-17. Summary of Wetland Characteristics in the U.S. Route 34 Project Area

Wetland Number	Wetland Type	Classification NWI	Classification NRCS	Predominant Vegetation	Basin Structure	FQI	Size Ha	Size Ac
	shrubland							
		PUBFh		*Phalaris arundinacea*				
				Scirpus fluviatilis				
				Typha latifolia				
125	marsh	PEMFd	W	*Aster simplex*	depressional area in floodplain of Mississippi River	12.50	1.66	4.10
				Scirpus fluviatilis				
126	wet meadow/ farmed wetland	PEMAdf	W	*Xanthium strumarium*	depressional area in floodplain of Mississippi River	3.00	0.15	0.36
129	floodplain forest	PFO1C,	W	*Salix nigra*	excavated area in floodplain of Mississippi River	10.40	0.38	0.94
		P(SS/EM)A		*Acer saccharinum*				
				Phalaris arundinacea				
130	wet meadow	PSS1C,	NW	*Amaranthus tuberculatus*	located in a low area in floodplain of Mississippi River	6.10	2.52	6.25
		PFO1Cd,						
		P(SS1/EM)Cd		*Panicum dichotomiflorum*				
				Phalaris arundinacea				
131	wet meadow	PEMAdf	FW	*Eclipta prostrata*	located in a low area in floodplain of Mississippi River	2.50	0.44	1.08
				Leersia oryzoides				
132	farmed wetland/ wet meadow	PEMAf	FW	*Panicum dichotomiflorum*	located in a low area in floodplain of Mississippi River	3.00	0.12	0.28
135	wet meadow	not mapped	not mapped	*Ipomoea lacunosa*	located in a low area in floodplain of Mississippi River	2.50	0.09	0.23
				Setaria glauca				
137	wet meadow/seep	not mapped	not mapped	*Agrostis alba*	located along a drainageway	12.25	0.05	0.11

The wetland characteristics within the project corridor including classification, dominant vegetation, soil type, basin structure, Floristic Quality Index (FQI) value, and size are summarized in Table 2-17. Ponds considered to be wetlands are included in this summary. The NWI and NRCS classifications are those which appear on the respective maps, and no classifications are assigned for those features which were not previously mapped but were identified in the field survey. Basin structure is a description of the landscape position of the wetland, and is based upon field observations. The predominant vegetation category lists those species indicated as dominant on field data forms. Soil type is that soil which is mapped at that site in the County Soil Survey.

The FQI is utilized in the State of Illinois as a means of assessing the quality of a vegetative community and also indicates the level of disturbance of a site. A general interpretation of FQI values is: (1) below 5 is indicative of a highly disturbed site; and (2) below 10 indicates a site of low natural quality. An index value of 20 or over suggests that a site contains a high proportion of native species, and may be considered a high quality community. Of the 94 jurisdictional wetlands, only one site exhibited an FQI above 20 (Site 76). This site is a sedge meadow and wet shrubland complex surrounded by an upland forest buffer. A predominance of the wetlands fell within an FQI range of 5 to 10 (42 wetlands) and >10 to 20 (52 wetlands). There were 19 wetlands where the FQI scores indicate low vegetative species diversity and highly disturbed conditions.

Wetlands identified within the project corridor generally occur within landscape types such as low lying areas, side slopes, and ravines which typically exhibit less disturbance by human activity due to the relative difficulty in converting them to agricultural use. Wetlands in these relatively undisturbed areas tend to have moderately diverse and conservative plant communities, and provide faunal habitat. Wetland and seep areas persist in floodplains, pasture, and cropland despite disturbance, although the associated plant communities tend toward less conservative species. These agricultural wetlands may offer a less desirable faunal habitat due to a lack of adequate cover. Wetlands also exist within relatively undisturbed floodplain areas. The majority of wetlands in the project corridor fall into two major categories: (1) ponds and (2) wet meadows.

The ponds in the project corridor consist mainly of impounded and/or excavated drainageways. These ponds occur mainly within agricultural areas. Most of the ponds contain natural vegetative fringes, which commonly consist of reed-canary grass (*Phalaris arundinacea*), cattails (*Typha latifolia*), and pondweed (*Potamogeton* spp.).

The plant diversity and FQI values of ponds tend to vary with the degree of abandonment and intensity of use. Those actively used for livestock watering are typically disturbed systems that contain simplified vegetation communities and offer reduced wildlife values relative to those ponds that have become abandoned from active use. A pond that has been abandoned for years will often provide greater value in the form of wildlife habitat and greater plant diversity. These systems will exhibit larger areas of emergent and submergent plant growth and contain stabilized banklines and substrates.

Ponds exhibit a variety of functions within the landscape, including spawning habitat for herpetofauna and fish; watering, cover, forage, and nesting areas for wildlife; flood and stormwater runoff storage; and act as sedimentation basins.

The wet meadows in the project corridor were found to occur in small depressions, along drainage-ways, or in former stream channels. Common species found in wet meadows include redtop grass (*Agrostis alba*), squirrel-tail grass (*Hordeum jubatum*), reed-canary grass (*Phalaris arundinacea*), beggar-ticks (*Bidens* spp.), and smartweed (*Polygonum* spp.). The depressional areas were found

mainly in agricultural fields, either in level, floodplain areas where the groundwater level is close to the soil surface, or within areas of more rolling topography. Wetlands along drainageways were located either adjacent to an existing stream, within an overflow channel, or along broad, vegetated swales. Typical species found in these areas include silver maple (*Acer saccharinum*), cottonwood (*Populus deltoides*), and American elm (*Ulmus americana*). Many of the wet meadows and sedge meadow sites are associated with seeps, which flow into larger streams. The FQI values, and thus the native plant community diversity of the wet meadow-sedge meadow wetlands, were found to be variable, ranging from a low value of 0.0 to a high value of 17.20. Wet meadows can exhibit a variety of functions including sedimentation trapping; flood water desynchronization; bankline/soil stabilization; and cover, nesting, and foraging areas for small mammals, birds, and herpetofauna.

Seeps are areas where groundwater is discharged through the soil surface. The flow in seep areas tends to be diffuse, or spread over a large area, rather than issuing from a concentrated outflow point, as in a spring. This seepage can be due to several factors including a high groundwater table or an impervious lithic layer at a shallow depth. Plant communities found in seep areas include such species as sweet flag (*Acorus calamus*), sedges (*Carex* and *Cyperus* spp.), beggar-ticks (*Bidens* spp.), rice cutgrass (*Leersia oryzoides*), and spotted touch-me-not (*Impatiens capensis*).

According to the INHS wetland survey, 23 of the 94 wetland sites are influenced by groundwater discharge. An additional 14 sites exhibit groundwater discharge as a potential component, and one site is reported as having potential subsurface flow. The sites exhibiting or indicating groundwater discharge predominantly include those areas associated with ponds, wet meadows, or sedge meadows. Groundwater is also a hydrological contributor in several floodplain forests and marsh sites and a wet shrubland site within the project corridor. Some of the ponds and wetlands may also receive groundwater from upstream sources.

Seeps often influence the development of certain wetland types within the landscape due to the seasonal or perennial issuance of water. Wet and sedge meadow communities develop along terraces of drainageways and creeks, and along side slopes due to saturated soil conditions and/or shallow surface inundation. Seeps also occur in proximity to open water bodies (ponds and lakes) creating a wetland (marsh, wet meadow, sedge meadow) fringe or corridor between a seep and a waterbody. Due to the semi-permanence of saturation/inundation, the vegetation communities occurring within seeps often exhibit relatively high FQI values; suggesting less disturbance and greater plant species diversity. Functions exhibited by seeps include groundwater discharge, soil stabilization (erosion reduction), and wildlife habitat.

According to the INHS botanical field survey report, the area designated as Site 4 contains a seep within an upland forest. This area is described in Table 2-13.

2.10 Special Waste

The USEPA listing of potential, suspected, and known hazardous waste or hazardous substance sites in Illinois (i.e., the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) has been reviewed to ascertain whether the proposed project will involve any listed site(s). As a result of this review, it has been determined that the proposed undertaking will not require any right-of-way or any easement from a site included in the CERCLIS listing as of March 28, 2001. An assessment was conducted along existing U.S. Route 34 to identify regulated and uncontrolled special waste and hazardous waste sites within the project corridor. Hazardous waste sites are regulated by the Resource, Conservation, and Recovery Act (RCRA) and/or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as

amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. Additionally, underground storage tanks (USTs) are regulated by the State of Illinois under the Gasoline Storage Act of 1998 and leaking underground storage tanks (LUSTs) are regulated by the State of Illinois under the LUST Program.

The initial step in the assessment process involved a search of federal and state databases for sites within the project corridor which were listed in the CERCLIS database, the IEPA Division of Land Pollution Control Land Inventory, and the IEPA LUST list. Upon completion of the listed sites review, field reconnaissance was conducted to determine the proximity of the listed sites to the existing U.S. Route 34.

On September 14, 1999, the ISGS submitted the PESA 1040, Final Report for FAP 313 (U.S. Route 34) to IDOT, and PESA 1040A was submitted on February 23, 2000 (see Appendix B). The following sites were identified as requiring Illinois Responsible Property Transfer (IRPTA) compliance:

- Ayerco Convenience Center (formerly Conoco gasoline station), Site 1040-1 [Figure 2-8 (1 of 2), SW-1];
- Residence (former gasoline station), Site 1040-B [Figure 2-8 (1 of 2), SW-2];
- Olson's Truck Inspection (formerly Olson's Truck Stop), Site 1040-C [Figure 2-8 (1 of 2), SW-3];
- Chris's Birdhouse, Site 1040-2 [Figure 2-8 (1 of 2), SW-4];
- Farm, Site 1040-D [Figure 2-8 (1 of 2), SW-5];
- Gladstone Grain Company, Site 1040-3 [Figure 2-8 (1 of 2), SW-6];
- Restaurant (former gasoline station), Site 1040-G [Figure 2-8 (1 of 2), SW-7];
- Robert G. Thompson Trucking, Site 1040-5 [Figure 2-8 (1 of 2), SW-8];
- Monmouth Municipal Airport, Site 1040A-1 [Figure 2-8 (2 of 2), SW-21];
- Brad's Repair, Site 1040A-2 [Figure 2-8 (2 of 2), SW-20];
- City of Monmouth Main Waste Water Treatment Plant, Site 1040A-B [Figure 2-8 (2 of 2), SW-19];
- City Ford Mercury, Site 1040A-C [Figure 2-8 (2 of 2), SW-18];
- Farmland Foods, Site 1040A-D [Figure 2-8 (2 of 2), SW-17];
- VSM Trucking, Inc., Site 1040A-3 [Figure 2-8 (2 of 2), SW-16];
- Equipco/IMI Cornelius, Site 1040A-E [Figure 2-8 (2 of 2), SW-15];
- Gibbi's Hamburgers, Site 1040A-4 [Figure 2-8 (2 of 2), SW-14];
- Former Monmouth Standard Home Center, Site 1040A-H [Figure 2-8 (2 of 2), SW-13];
- The Pottery Barn/Metal Crafters, Site 1040A-J [Figure 2-8 (2 of 2), SW-12];
- Beck Oil Company, Site 1040A-5 [Figure 2-8 (2 of 2), SS-3];
- Wareco #340, Site 1040A-6 [Figure 2-8 (2 of 2), SS-4];
- Stockland FS, Inc., Site 1040A-7 [Figure 2-8 (2 of 2), SS-5];
- CMS Tire Service/Morath Automotive Repair, Site 1040A-8 [Figure 2-8 (2 of 2), SW-9];
- Casey's General Store, Site 1040A-9 [Figure 2-8 (2 of 2), SS-6];
- Former Bulk Oil Terminal, Site 1040A-10 [Figure 2-8 (2 of 2), SW-11]; and
- Former State Garage, Site 1040A-Q [Figure 2-8 (2 of 2), SW-10].

These sites are discussed in Section 2.10.2.

2.10.1 Hazardous Waste

Based on information obtained from the USEPA CERCLIS on-line database, there are no active CERCLA sites within 1.6 km (1 mi) of the preferred alternative within either Warren or Henderson Counties. The CERCLIS database was last revised on March 28, 2001.

2.10.1.1 Non-Hazardous Waste

Ayerco Convenience Center, Site 1040-1

Near the western terminus of the project, at the northwest corner of Carman Road and U.S. Route 34, is the Ayerco Convenience Center, Site 1040-1 [see Figure 2-8 (1 of 2), SW-1]. According to the information within the PESA, Site 1040-1 has been occupied by a gasoline station since approximately 1965. The site reportedly has five tanks still in place, although one of the tanks was reportedly filled in place. The four tanks still in use were upgraded in 1998 to include spill and overfill protection.

Residence (Former Gasoline Station), Site 1040-B

Site 1040-B [see Figure 2-8 (1 of 2), SW-2], currently occupied by a residence and garage, was reportedly a small gasoline station during the 1930s and 1940s. No evidence of USTs was noted at the site at the time of the PESA; the site is approximately 350 m (1,150 ft) from the centerline of the preferred alternative.

Olson's Truck Inspection Station, Site 1040-C

Olson's Truck Inspection Station, a former UST site, is located at the southwest corner of CR1300N and U.S. Route 34 [see Figure 2-8 (1 of 2), SW-3]. Olson's is located approximately 350 m (1,150 ft) from the centerline of the preferred alternative (Figure 2-8a, SW-3)

Chris's Birdhouse, Site 1040-2

Site 1040-2 [see Figure 2-8 (1 of 2), SW-4], currently occupied by a steel building containing a pet supply business, was reportedly the site of a small gasoline station, possibly during the 1940s and 1950s. No evidence of USTs was noted at the site at the time of the PESA and the site is approximately 150 m (490 ft) from the centerline of the preferred alternative.

Farm, Site 1040-D

Site 1040-D [see Figure 2-8 (1 of 2), SW-5], currently occupied by a farmstead, was reportedly the site of a diesel UST dispenser. The site was inspected and sampled by the ISGS in 1994 and reinspected by the ISGS during the preparation of the PESA. No evidence of USTs was noted at the site at the time of the PESA; the site is approximately 215 m (700 ft) from the centerline of the preferred alternative.

Gladstone Grain Company, Site 1040-3

Site 1040-3 [see Figure 2-8 (1 of 2), SW-6], currently occupied by the Gladstone Grain Company (a grain storage facility), is located on the south side of U.S. Route 34 at the intersection of U.S. Route 34 and Illinois Route 164. During the preparation of the PESA, soil samples were taken from an area along the south side of Route 34 where distressed vegetation was noted. The results of the sampling and analysis are discussed in Section 4.12.2.

Restaurant, Former Gasoline Station, Site 1040-G

Site 1040-G [see Figure 2-8 (1 of 2), SW-7], currently occupied by a restaurant named The Feed Store, was reportedly the site of a gasoline station from the 1940s until the 1960s, at which time the

site was converted to a restaurant/diner. The site was inspected by the ISGS during the preparation of the PESA. No evidence of USTs was noted at the site at the time of the PESA, and the site is approximately 215 m (700 ft) from the centerline of the preferred alternative.

Thompson Trucking, Site 1040-5

Thompson Trucking, located approximately 1.6 km (1 mi) south of Kirkwood at the southeast corner of the intersection of 150th Avenue and 20th Street [see Figure 2-8 (1 of 2), SW-8], is a former UST site. The UST was reported by the owner to have been removed in accordance with Illinois Office of State Fire Marshal (OSFM) regulations (personal communication). Thompson Trucking still uses the facility to perform maintenance and repairs on their vehicles. At the time of the site inspection, approximately 20 junked/wrecked vehicles were parked on the south side of the site.

CMS Tire Service/Morath Automotive (CMS Tire), Site 1040A-8

CMS Tire, located at 1211 West Broadway, Monmouth, is at the southeast corner of the right-of-way for the U.S. Route 34/67 intersection at Broadway [see Figure 2-8 (1 of 2), SW-9]. The tanks onsite were removed in August 1998 (personal communication).

Stockland FS, Site 1040A-7

The Stockland FS facility [see Figure 2-8 (2 of 2), SS-5] is located at 1010 North Main Street and is an active gas station. Elevated volatile organic constituents (VOCs) were detected in borings installed by the ISGS as part of the PESA.

Wareco #340, Site 1040A-6

Wareco #34, located at 1125 North Main [see Figure 2-8 (2 of 2), SS-4] is an active service station. No elevated VOCs were identified during the analysis of samples collected by the ISGS during the PESA.

Beck Oil Company, Site 1040A-5

Beck Oil, an active Citgo station, is located at the northwest corner of the intersection of U.S. Route 34 and Main Street [see Figure 2-8 (2 of 2), SS-3]. The onsite USTs were installed approximately 20 m (65 ft) west of Main Street right-of-way and 49 m (160 ft) north of the U.S. Route 34 right-of-way in 1995.

The Pottery Barn/Metal Crafters, Site 1040A-J

The Pottery Barn, located on the east side of Main Street approximately 80 m (262 ft) north of the proposed U.S. Route 34 right-of-way [see Figure 2-8 (2 of 2), SW-12], has two exempt heating oil USTs onsite.

Former Monmouth Standard Home Center, Site 1040A-H

This site is located at 1301 North Main Street approximately 122 m (400 ft) north of the proposed right-of-way [see Figure 2-8 (2 of 2), SW-13]. Given the distance from the proposed right-of-way, the ISGS did not collect samples.

Gibbi's Hamburgers, Site 1040A-4

This facility is located at the northwest corner of the intersection of U.S. Route 34 and North Sixth Street approximately 46 m (150 ft) north of U.S. Route 34 [see Figure 2-8 (2 of 2), SW-14]. Sampling conducted by the ISGS did not detect elevated VOCs at this facility.

Equipco/IMI Cornelius, Site 1040A-E
The Equipco/IMI site, located at 1181 North Sixth Street, is approximately 40 m (131 ft) north of the U.S. Route 34 right-of-way [see Figure 2-8 (2 of 2), SW-15]. The site formerly housed a K-Mart, which had one UST. No indication of contamination from the (removed) waste oil UST was found in the OSFM closure report. No sampling was conducted by the ISGS.

VSM Trucking, Site 1040A-3
This site is a fueling facility located at 1291 North Sixth Street [see Figure 2-8 (2 of 2), SW-16]. Sampling conducted by the ISGS did not detect elevated levels of VOCs.

Farmland Foods, Site 1040A-D
Farmland Foods at 1220 North Sixth Street [see Figure 2-8 (2 of 2), SW-17] is the site of a removed UST. The closure report indicated that no contaminated soils were present. The UST was located more than 61 m (200 ft) north of the project boundary.

City Ford Mercury, Site 1040A-C
City Ford at 800 access Road A [see Figure 2-8 (2 of 2), SW-18] is an UST site located more than 61 m (200 ft) north of the project limits north and east of the U.S. Route 34/North Sixth Street intersection. No testing was performed by the ISGS at this site.

City of Monmouth Main Waste Water Treatment Plant, Site 1040A-B
This facility is located at 1033 East Jackson Avenue approximately 200 m (656 ft) south of the edge of U.S. Route 34 pavement and approximately 200 m (656 ft) west of the centerline of 11th Street [see Figure 2-8 (2 of 2), SW-19]. Given the distance from the project, this LUST site was not sampled by the ISGS.

Brad's Repair, Site 1040A-2
Brad's Repair located at 1112 East Jackson Avenue [see Figure 2-8 (2 of 2), SW-20] is a LUST/UST site. The ISGS conducted sampling downgradient of the former UST area and detected no VOCs significantly above background levels.

Monmouth Municipal Airport, Site 1040A-1
The airport, located on the west side of 11th Street north of U.S. Route 34 [see Figure 2-8 (2 of 2), SW-21], is a former UST/LUST site. The site was undergoing remedial action for leaks attributed to the former UST piping. The location where contaminated soils were found is approximately 200 m (656 ft) north of the north end of the project along 11th Street.

Monmouth State Garage, Site 1040A-Q
The Monmouth State Garage, located at 710 180th Avenue [see Figure 2-8 (2 of 2), SW-10], is a LUST site which was issued a no further response (NFR) letter by the IEPA. The site is approximately 30 m (100 ft) beyond the limits of the project.

Former Bulk Oil Terminal, Site 1040A-10
This facility, located at 500 South Sunny Lane [see Figure 2-8 (2 of 2), SW-11], is currently a grain storage facility. The site was reportedly a bulk oil terminal from 1952 to 1980. Sampling conducted by the ISGS did not detect elevated VOC concentrations.

Casey's General Store, Site 1040A-9
Casey's is located on the north side of Broadway between U.S. Route 34 and Sunny Lane [see Figure 2-8 (2 of 2), SS-6]. Two USTs were installed when the facility was built in 1997-1998.

2.10.2 Other Potential Special Waste

The database did not identify any potential waste sites within the project corridor. However, additional areas of concern may be identified after design of the preferred alternative has been completed. Additional sources of potential special waste may include farm buildings, dwellings, home heating oil tanks, and farm fuel tanks. Properties affected by the preferred alternative that include buildings have the potential to generate certain types of wastes. The destruction of these structures may involve asbestos-containing building materials (ACBMs), lead-containing materials, and generic demolition debris. In addition, storage tanks used for the storage of fuel oil, gasoline, or diesel fuel may be present at these properties

2.11 Visual Resources

There are three different landscape areas within the corridor project corridor: the 10-km (6.2-mi) wide Mississippi River floodplain area; the narrow bluff area approximately 2.5-km (1.6 mi) wide; and the broad upland area. The floodplain area is very flat with an area, however, of windblown sand immediately adjoining the bluff that provides 12 to 15 m (40 to 50 ft) between the floodplain and the uplands. The land surface of the upland is level to undulating with minor streams flowing to the west. This subdued topography prevails throughout the majority of the project corridor.

The vegetation in both the floodplain and upland is primarily agriculture crops. The forested areas of the bluffs provide the corridor alternates with the most visual diversity (color and form) and best views within the project area. Views of the streams along the proposed alternatives are of average quality of experience for streams in agricultural areas. The homogeneous topography patterns, vegetation, and streams throughout the majority of the project corridor provide limited visual diversity.